



STIC Search Report

Biotech-Chem Library

STIC Database Tracking Number: 224442

TO: Tony S Chuo
Location: REM 6C11
Art Unit: 1745
Friday, May 18, 2007
Case Serial Number: 10/767107

From: Usha Shrestha
Location: Biotech-Chem Library
REM-1A64
Phone: (571)272-3519

Usha.shrestha@uspto.gov

Search Notes

Examiner Chuo,

See attached results.

If you have any questions about this search feel free to contact me at any time.

Thank you for using STIC search services!

Usha Shrestha
Technical Information Specialist
STIC Biotech/Chem Library
(571)272-3519

STIC SEARCH RESULTS FEEDBACK FORM

Biotech-Chem Library

Questions about the scope or the results of the search? Contact *the searcher or contact*:

Mary Hale, Information Branch Supervisor
571-272-2507 Remsen 1 A51

Voluntary Results Feedback Form

➤ I am an examiner in Workgroup: Example: 1610

➤ Relevant prior art **found**, search results used as follows:

- ☐ 102 rejection
- ☐ 103 rejection
- ☐ Cited as being of interest.
- ☐ Helped examiner better understand the invention.
- ☐ Helped examiner better understand the state of the art in their technology.

Types of relevant prior art found:

- ☐ Foreign Patent(s)
- ☐ Non-Patent Literature
(journal articles, conference proceedings, new product announcements etc.)

➤ Relevant prior art **not found**:

- ☐ Results verified the lack of relevant prior art (helped determine patentability).
- ☐ Results were not useful in determining patentability or understanding the invention.

Comments:

Drop off or send completed forms to STIC/Biotech-Chem Library, Remsen Bldg.

Janks, Kendra

224442

From: TONY CHUO [Tony.Chuo@uspto.gov]
Sent: Thursday, May 10, 2007 2:09 PM
To: STIC-EIC1700
Subject: Database Search Request, Serial Number: 10767107

Requester:
TONY CHUO (P/1745)
Art Unit:
GROUP ART UNIT 1745
Employee Number:
81950
Office Location:
REM 06C11
Phone Number:
(571)272-0717
Mailbox Number:

SCIENTIFIC REFERENCE BR
Sci & Tech Inf. Cntr

MAY 10 REC'D

Case serial number:
10767107
Class / Subclass(es):
429/19
Earliest Priority Filing Date:
1/31/03
Format preferred for results:

Pat. & T.M. Office

Paper
Search Topic Information:

A system for storing and dispensing a gas comprising:

a) a housing comprising a gas collection compartment and gas storage compartment.

b) a plurality of microtubular elements disposed in the housing having one or more ends in fluid communication with either gas collection compartment or the gas storage compartment and extending from the compartment with which it is in fluid communication and into the other compartment, wherein each of the microtubular elements comprises a tubular wall permeable to the gas and defining a bore side and shell side.

c) a seal that isolates the gas collection compartment from the gas storage compartment.

d) a carrier material that is disposed in the gas storage compartment which may be on the bore sides or the shell sides of the microtubular elements.

Special Instructions and Other Comments:

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ABSTRACT OF THE DISCLOSURE

The present invention relates to a gas storage and dispensing system, which comprising a carrier material for a target gas and multiple microtubular elements in contact with such carrier material. Each microtubular element comprises a tubular wall that defines a bore side and a shell side that are sealed from each other, preferably by one or more potting members. The carrier material is either at the bore sides or at the shell sides of the microtubular elements, and it can be either a solid sorbent material for the target gas, or a liquid carrier therefor. Such gas storage and dispensing system is particular useful for hydrogen storage, when the carrier material can be a hydrogen-sorbent that contains hydrogen gas, or liquefied hydrogen, or an organic hydrogen solution, or a metal hydride solution capable of generating hydrogen gas. Such microtubular elements can further be designed as microfibrinous fuel cells, while each microfibrinous fuel cell comprises a carrier material at its bore side:

Section II: (Amendments to Claims)

Please amend claims 1, 4, 7, 11, 12, 18, 31-34, 36, 41 and 44; cancel claims 15 and 40, and add new claims 49 and 50, as set out in the following listing of claims 1-50:

1. (Currently Amended) A storage and dispensing system for storing and dispensing a target gas, comprising:
 - (a) a housing comprising a gas collection compartment and a gas storage compartment
 - (b) a plurality of microtubular elements disposed in said housing i) having one or more open ends in fluid communication with either the gas collection compartment or the gas storage compartment and ii) extending from said compartment with which it is in fluid communication and into the other compartment, wherein each of said microtubular elements comprises a tubular wall permeable to the target gas and defining a bore side and a shell side; ~~and wherein the bore side of each of said microtubular elements is sealed from the shell side thereof; and~~
 - (c) a seal which, together with the tubular walls, sealingly isolates the gas collection compartment from the gas storage compartment; and
 - (d) a carrier material for said target gas, wherein said carrier material is disposed in said gas storage compartment, which may be on housing and at either the bore sides or the shell sides of said microtubular elements.
2. (Original) The storage and dispensing system of claim 1, wherein the carrier material for said target gas is disposed at the bore sides of said microtubular elements.
3. (Original) The storage and dispensing system of claim 2, wherein the carrier material for said target gas comprises at least one sorbent material having sorptive affinity for the target gas.
4. (Currently Amended) The storage and dispensing system of claim 3, wherein said sorbent material comprises a physical sorbent [[and/or]], a chemisorbent, or both.

5. (Original) The storage and dispensing system of claim 3, wherein the target gas comprises hydrogen, and wherein the sorbent material comprises at least one hydrogen-sorbent.
6. (Original) The storage and dispensing system of claim 5, wherein said at least one hydrogen-sorbent comprises a material selected from the group consisting of metal hydride alloys, carbonaceous materials, zeolites, silica gels, amorphous metal compositions, and molecular sieves.
7. (Currently amended) The storage and dispensing system of claim 2, wherein the tubular walls of said microtubular elements are also liquid ~~not permeable to the target gas~~.
8. (Original) The storage and dispensing system of claim 2, wherein the carrier material for said target gas comprises a liquid carrier material.
9. (Original) The storage and dispensing system of claim 8, wherein the target gas comprises hydrogen, and wherein the liquid carrier material comprises at least one material selected from the group consisting of liquefied hydrogen, organic hydrogen solvents, and metal hydride solutions.
10. (Original) The storage and dispensing system of claim 1, wherein the carrier material for said target gas is disposed at the shell sides of said microtubular elements.
11. (Currently amended) The storage and dispensing system of claim ~~[[11]]~~ 10, wherein the carrier material comprises at least one sorbent material having sorptive affinity for the target gas.
12. (Currently amended) The storage and dispensing system of claim 11, wherein said at least one sorbent material comprises a physical sorbent, ~~[[and/or]]~~ a chemisorbent, or both.
13. (Original) The storage and dispensing system of claim 11, wherein the target gas comprises hydrogen, and wherein the sorbent material comprises at least one hydrogen-sorbent.

14. (Original) The storage and dispensing system of claim 13, wherein said at least one hydrogen-sorbent comprises a material selected from the group consisting of metal hydride alloys, carbonaceous materials, zeolites, silica gels, amorphous metal compositions, and molecular sieves.
15. (Cancelled)
16. (Original) The storage and dispensing system of claim 10, wherein the carrier material for said target gas comprises a liquid carrier material.
17. (Original) The storage and dispensing system of claim 16, wherein the target gas comprises hydrogen, and wherein the liquid carrier material comprises at least one material selected from the group consisting of liquefied hydrogen, organic hydrogen solvents, and metal hydride solutions.
18. (Currently amended) The storage and dispensing system of claim 17, wherein the seal comprises microtubular elements are potted at one or more ends by one or more potting members at or proximate to the one or more open ends of said microtubular elements on so that the bore sides of said microtubular elements, are sealed from the shell sides thereof by said one or more potting members in and providing a leak-tight seal manner, wherein said one or more potting members, said tubular walls, and said housing define: (1) at least one liquid compartment for holding said liquid carrier material, and (2) at least one hydrogen collection compartment separated from said liquid compartment in a leak-tight manner, wherein said microtubular elements extend from said liquid compartment to said hydrogen collection compartment, so that the shell sides of said microtubular elements at least partially contact the liquid carrier material in the liquid compartment, and that the bore sides of said microtubular elements are in fluid communication with said hydrogen collection compartment, and wherein the housing comprises at least one hydrogen outlet connected to said hydrogen collection compartment for dispensing hydrogen gas therefrom.
19. (Original) The storage and dispensing system of claim 18, wherein the tubular walls of the microtubular elements comprise a membrane material that is gas-permeable but liquid-impermeable.

20. (Original) The storage and dispensing system of claim 19, wherein said membrane material comprises a microporous, hydrophobic polymeric material.
21. (Original) The storage and dispensing system of claim 18, wherein the tubular walls of the microtubular elements comprises a first layer of structural material that is gas- and liquid-permeable, and a second layer of membrane material that is gas-permeable but liquid-impermeable.
22. (Original) The storage and dispensing system of claim 18, wherein the liquid carrier material comprises at least one metal hydride solution.
23. (Original) The storage and dispensing system of claim 22, wherein the metal hydride solution comprises NaBH_4 .
24. (Original) The storage and dispensing system of claim 23, wherein the metal hydride solution comprises NaBH_4 at a concentration in a range of from about 10% to about 35% by total weight of said solution, and wherein the metal hydride solution further comprises sodium hydroxide at a concentration in a range of from about 2% to about 4% by total weight of said solution.
25. (Original) The storage and dispensing system of claim 22, further comprising a catalyst-based hydrogen release control mechanism associated with the liquid compartment.
26. (Original) The storage and dispensing system of claim 22, further comprising a pH-based hydrogen release control mechanism associated with the liquid compartment.
27. (Original) The storage and dispensing system of claim 22, further comprising a water supply for controllably adding water to the liquid compartment.
28. (Original) The storage and dispensing system of claim 27, arranged and configured for supplying hydrogen gas to a downstream hydrogen fuel cell assembly for generation of electrical energy, wherein said hydrogen fuel cell assembly comprises a water management mechanism for removing water generated during the electrochemical reaction from said assembly, and wherein

the water supply of said storage and dispensing system is connected to the water management mechanism of the hydrogen fuel cell assembly, so that the water generated by said hydrogen fuel cell assembly is controllably added to the liquid compartment of the storage and dispensing system.

29. (Original) The storage and dispensing system of claim 22, wherein each of the tubular walls of said microtubular elements comprises a first layer of a catalyst material, a second layer of a membrane material that is gas-permeable but liquid-impermeable, and a third layer of a structural material that is gas- and liquid-permeable.
30. (Original) The storage and dispensing system of claim 22, wherein the tubular wall of each microtubular element is impregnated with a catalyst material and has a coating of a membrane material that is gas-permeable but liquid-impermeable on an inner surface thereof.
31. (Withdrawn-Currently Amended) A hydrogen generation catalyst structure~~[[,]]~~ comprising a microtubular element comprising a hydrogen gas permeable tubular wall defining a bore side and a shell side and an immobilized hydrogen generation catalyst material ~~and a plurality of microtubular elements in contact therewith, wherein each of said microtubular elements comprises a tubular wall defining a bore side and a shell side, and wherein the bore side of each of said microtubular elements is sealed from the shell side thereof.~~
32. (Withdrawn-Currently Amended) The hydrogen generation catalyst structure of claim 31, wherein the gas permeable tubular wall a) is also liquid permeable and has impregnated therein the hydrogen generation catalyst material or b) comprises two or more layers, including a bore side layer and a shell side layer, at least one said bore side or shell side layers being liquid permeable and having contained therein the hydrogen generation catalyst ~~is impregnated in the tubular walls of the microtubular elements.~~
33. (Withdrawn-Currently Amended) The hydrogen generation catalyst structure of claim 31, wherein the gas permeable tubular wall is also liquid permeable and the hydrogen generation catalyst material is disposed at the bore sides side ~~of the microtubular elements~~ element.

34. (Withdrawn-Currently Amended) The hydrogen generation catalyst structure of claim 31, further comprising a plurality of said microtubular elements and a housing[[,]] in which the plurality of microtubular elements ~~and the hydrogen generation catalyst material~~ are disposed, wherein the ~~hydrogen generation catalyst material is either impregnated in the tubular walls of the microtubular elements or disposed at the bore sides thereof, wherein the~~ microtubular elements are potted at one or more ends by one or more potting members, so that the bore sides of said microtubular elements are sealed from the shell sides thereof by said one or more potting members in a leak-tight manner, wherein said one or more potting members and said housing define a first liquid compartment and a second liquid compartment separated from each other in a leak-tight manner, wherein said microtubular elements extend from said first liquid compartment to said second liquid compartment, so that the bore sides of said microtubular elements are in fluid communication with the first liquid compartment, and the shell sides of said microtubular elements are in fluid communication with the second liquid compartment, wherein fluid flows between the first and the second liquid compartments by diffusing through the tubular walls of the microtubular elements, wherein one of the first and the second liquid compartments is connected to a fluid inlet, and the other is connected to a fluid outlet.
35. (Withdrawn) The hydrogen generation catalyst structure of claim 34, wherein the first liquid compartment is connected to a fluid inlet for introducing a metal hydride solution thereinto, wherein the second liquid compartment is connected to a fluid outlet, so that the metal hydride solution flows from the first liquid compartment into the bore sides of the microtubular elements, through the tubular walls thereof, to the shell sides of said microtubular elements, and being collected in said second liquid compartment, during which the metal hydride solution comes into contact with the immobilized hydrogen generation catalyst material in said microtubular elements for generation of hydrogen gas, and is then discharged from the fluid outlet.
36. (Withdrawn-Currently Amended) A microfibrinous fuel cell structure, comprising:
- a hollow fibrous membrane separator defining a shell side and a bore side;
 - an inner current collector at the bore side of said hollow fibrous membrane separator;
 - an inner electrocatalyst layer at the bore side of said hollow fibrous membrane separator;
 - an outer current collector at the shell side of said hollow fibrous membrane separator;
 - an outer electrocatalyst layer at the shell side of said hollow fibrous membrane separator; and

a hydrogen supply structure at the bore side of said hollow fibrous membrane separator, which hydrogen supply structure comprises i) a microtubular element comprising a hydrogen gas permeable tubular membrane defining a bore side and a shell side and ii) a carrier material for hydrogen gas disposed at the bore side of said tubular membrane.

37. (Withdrawn) The microfibrinous fuel cell structure of claim 36, wherein the carrier material comprises at least one hydrogen-sorbent.
38. (Withdrawn) The microfibrinous fuel cell structure of claim 37, wherein said at least one hydrogen-sorbent is selected from the group consisting of metal hydride alloys, carbonaceous materials, zeolites, silica gels, amorphous metal compositions, and molecular sieves.
39. (Withdrawn) The microfibrinous fuel cell structure of claim 36, wherein said hydrogen supply structure further comprises a fluid path within said carrier material, to allow passage of hydrogen gas therethrough.
40. (Cancelled)
41. (Withdrawn-Currently Amended) The microfibrinous fuel cell structure of claim ~~[[40]]~~ 36, wherein the gas permeable tubular membrane of said hydrogen supply structure comprises a porous polymeric membrane material.
42. (Withdrawn) The microfibrinous fuel cell structure of claim 41, wherein said porous polymeric membrane material comprises a polymeric material selected from the group consisting of polyolefins, polysulfones, polyvinyl chloride, polyvinyl fluoride, polytetrafluoroethylenepolypropylene copolymer, polyamides, polyphenylene oxide-polystyrenes and polycarbonates.
43. (Withdrawn) The microfibrinous fuel cell structure of claim 41, wherein said porous polymeric membrane material comprises polypropylene.
44. (Withdrawn-Currently Amended) The microfibrinous fuel cell structure of claim 36, wherein the carrier material comprises a liquid carrier material for hydrogen gas, ~~and wherein said hydrogen supply structure further comprises a tubular membrane that encloses said liquid carrier material,~~ and wherein said tubular membrane is hydrogen-permeable but liquid-impermeable.

45. (Withdrawn) The microfibrinous fuel cell structure of claim 44, wherein said liquid carrier material comprises at least one material selected from the group consisting of liquefied hydrogen, organic hydrogen solvents, and metal hydride solutions.
46. (Withdrawn) The microfibrinous fuel cell structure of claim 44, wherein said liquid carrier material comprises a metal hydride solution, and wherein the tubular membrane of said hydrogen supply structure comprises an outer layer of a microporous, hydrophobic polymeric membrane material, and an inner layer of a hydrogen generation catalyst material in contact with the metal hydride solution.
47. (Withdrawn) A fuel cell assembly comprising multiple microfibrinous fuel cell structures as in claim 36.
48. (Cancelled).
49. (New) The storage and dispensing system of claim 1 wherein the carrier is a metal hydride solution that generates the target gas upon contact with a catalyst and said gas permeable microtubular wall comprises said catalyst.
50. (New) The storage and dispensing system of claim 49 wherein the gas permeable microtubular wall is also liquid permeable and the system further comprises an inlet and an outlet for said metal hydride solution, the inlet being in fluid communication with the gas storage compartment and the outlet being in fluid communication with the gas collection compartment, whereby the target gas is generated concurrent with the passing of the metal hydride solution through the permeable microtubular wall.

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				R CYLIND? OR ADJUTAG?	
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 L52 13 SEA FILE=HCAPLUS ABB=ON PLU=ON L51 AND (L20 OR L21)
 L53 2 SEA FILE=HCAPLUS ABB=ON PLU=ON L52 AND DEV/RL
 L54 12 SEA FILE=HCAPLUS ABB=ON PLU=ON L48 AND DEV/RL
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 L67 6 SEA FILE=WPIX ABB=ON PLU=ON L61 AND DISPENS?/BIX,BIEX,TT,
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 M? OR TUBELIKE? OR PIPE# OR PIPING# OR PIPELI? OR PIPETTE
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 R CYLIND? OR ADJUTAG?
 L70 3802 SEA FILE=COMPENDEX ABB=ON PLU=ON L7 AND L8 AND L9
 L71 27 SEA FILE=COMPENDEX ABB=ON PLU=ON L70 AND FUEL CELL?
 L72 0 SEA FILE=COMPENDEX ABB=ON PLU=ON L71 AND DISPENS? (4A) GAS
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 L73 4 SEA FILE=COMPENDEX ABB=ON PLU=ON L71 AND (DISPENS? OR
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 L74 12 SEA FILE=COMPENDEX ABB=ON PLU=ON L71 AND (GAS# OR
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 L75 12 SEA FILE=COMPENDEX ABB=ON PLU=ON (L72 OR L73 OR L74)

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L8 QUE ABB=ON PLU=ON TANK? OR HOUSING? OR CASING? OR SHR
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M? OR TUBELIKE? OR PIPE# OR PIPING# OR PIPELI? OR PIPETTE
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L77 7075 SEA FILE=JAPIO ABB=ON PLU=ON L76 AND (GAS# OR HYDROGEN
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L78 174 SEA FILE=JAPIO ABB=ON PLU=ON L77 AND FUEL CELL?
L79 42 SEA FILE=JAPIO ABB=ON PLU=ON L78 AND (DISPENS? OR
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L81 40 SEA FILE=JAPIO ABB=ON PLU=ON L79 AND H01M0008?/IPC
L86 1 SEA FILE=JAPIO ABB=ON PLU=ON L81 AND (SEPATAT? OR DIVID?
OR COMPARTMENT?)
L87 37 SEA FILE=JAPIO ABB=ON PLU=ON L81 AND H01M0008-04/IPC
L88 12 SEA FILE=JAPIO ABB=ON PLU=ON L87 AND H01M0008-06/IPC
L89 10 SEA FILE=JAPIO ABB=ON PLU=ON L87 AND H01M0008-10/IPC
L90 4 SEA FILE=JAPIO ABB=ON PLU=ON L88 AND H01M0008-10/IPC
L91 18 SEA FILE=JAPIO ABB=ON PLU=ON (L88 OR L89 OR L90)
L92 19 SEA FILE=JAPIO ABB=ON PLU=ON L91 OR L86

=> dup rem 155 168 175 192

FILE 'HCAPLUS' ENTERED AT 10:20:04 ON 18 MAY 2007
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PROCESSING COMPLETED FOR L55
PROCESSING COMPLETED FOR L68
PROCESSING COMPLETED FOR L75
PROCESSING COMPLETED FOR L92

L96 66 DUP REM L55 L68 L75 L92 (2 DUPLICATES REMOVED)
ANSWERS '1-25' FROM FILE HCAPLUS
ANSWERS '26-35' FROM FILE WPIX
ANSWERS '36-47' FROM FILE COMPENDEX
ANSWERS '48-66' FROM FILE JAPIO

=> d 1-25 ibib ed abs hitrn hitind

L96 ANSWER 1 OF 66 HCAPLUS COPYRIGHT 2007 ACS on STN DUPLICATE 1
ACCESSION NUMBER: 2004:802370 HCAPLUS

DOCUMENT NUMBER: 141:280419
 TITLE: Fuel cell systems with **hydrogen storage capacity**
 INVENTOR(S): Eshraghi, Ray R.; Riley, Michael W.; Lin, Jung-Chou
 PATENT ASSIGNEE(S): USA
 SOURCE: U.S. Pat. Appl. Publ., 27 pp.
 CODEN: USXXCO
 DOCUMENT TYPE: Patent
 LANGUAGE: English
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 2004191588	A1	20040930	US 2004-767107	20040128
PRIORITY APPLN. INFO.:			US 2003-443981P	P 20030131

ED Entered STN: 01 Oct 2004

AB The present invention relates to a gas **storage** and dispensing system, which comprises a carrier material for a target gas and multiple microtubular elements in contact with such carrier material. Each microtubular element comprises a tubular wall that defines a bore side and a shell side that are sealed from each other, preferably by one or more potting members. The carrier material is either at the bore sides or at the shell sides of the microtubular elements, and it can be either a solid sorbent material for the target gas, or a liquid carrier therefor. Such gas **storage** and dispensing system is particularly useful for **hydrogen storage**, when the carrier material can be a **hydrogen** -sorbent that contains **hydrogen** gas, or liquefied **hydrogen**, or an organic **hydrogen** solution, or a metal hydride solution capable of generating **hydrogen** gas. Such microtubular elements can further be designed as microfibrinous fuel cells, while each microfibrinous fuel cell comprises a carrier material at its bore side.

IT 1333-74-0, **Hydrogen**, uses
 (fuel cell systems with **hydrogen storage capacity**)

IC ICM H01M008-18
 ICS H01M008-10; H01M002-00; H01M002-02; H01M002-08

INCL 429019000; 429031000; 429034000; 429035000

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 Section cross-reference(s): 38, 56

ST fuel cell system **hydrogen storage capacity**

IT Membranes, nonbiological
 (H-permeable; fuel cell systems with **hydrogen storage capacity**)

IT Adsorbents
 (chemisorbents; fuel cell systems with **hydrogen storage capacity**)

IT Catalysts
 Dispensing apparatus
 Fuel cells

Molecular sieves

Sorbents

Storage

(fuel cell systems with **hydrogen storage capacity**)

IT Polyamides, uses

Polycarbonates, uses
Polyolefins
Polysulfones, uses
 (fuel cell systems with **hydrogen storage**
 capacity)
IT Carbonaceous materials (technological products)
 (fuel cell systems with **hydrogen storage**
 capacity)
IT Fluoropolymers, uses
 (fuel cell systems with **hydrogen storage**
 capacity)
IT Hydrides
 (fuel cell systems with **hydrogen storage**
 capacity)
IT Metallic glasses
 (fuel cell systems with **hydrogen storage**
 capacity)
IT Silica gel, uses
 (fuel cell systems with **hydrogen storage**
 capacity)
IT Zeolites (synthetic), uses
 (fuel cell systems with **hydrogen storage**
 capacity)
IT Membranes, nonbiological
 (hollow-fiber; fuel cell systems with **hydrogen**
 storage capacity)
IT Alloys, uses
 (**hydrogen** absorbing alloys; fuel cell systems with
 hydrogen storage capacity)
IT Epoxy resins, uses
 (potting; fuel cell systems with **hydrogen storage**
 capacity)
IT 7440-06-4, Platinum, uses 7440-18-8, Ruthenium, uses
 (fuel cell systems with **hydrogen storage**
 capacity)
IT 9002-86-2, Polyvinyl chloride 24981-14-4, Polyvinyl fluoride
27029-05-6, Propylene-tetrafluoroethylene copolymer
 (fuel cell systems with **hydrogen storage**
 capacity)
IT 1310-73-2, Sodium hydroxide, uses
 (fuel cell systems with **hydrogen storage**
 capacity)
IT 1333-74-0, **Hydrogen**, uses
 (fuel cell systems with **hydrogen storage**
 capacity)
IT 16940-66-2 24937-79-9, PvdF
 (fuel cell systems with **hydrogen storage**
 capacity)

L96 ANSWER 2 OF 66 HCAPLUS COPYRIGHT 2007 ACS on STN DUPLICATE 2

ACCESSION NUMBER: 2002:963815 HCAPLUS

DOCUMENT NUMBER: 138:15293

TITLE: Fuel cell refueling station and system

PATENT ASSIGNEE(S): Chart Inc., USA

SOURCE: Eur. Pat. Appl., 12 pp.

CODEN: EPXXDW

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
EP 1267432	A2	20021218	EP 2002-254177	20020617
EP 1267432	A3	20050330		
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR				
US 2003021743	A1	20030130	US 2002-172367	20020614
JP 2003118548	A	20030423	JP 2002-175395	20020617
US 2006090399	A1	20060504	US 2005-303692	20051216
PRIORITY APPLN. INFO.:			US 2001-298476P	P 20010615
			US 2002-172367	A3 20020614

ED Entered STN: 20 Dec 2002

AB A station for dispensing liquid natural gas (LNG) and **hydrogen** to vehicles features a bulk tank which receives LNG from a tanker truck. LNG from the bulk tank may be directed to either an LNG conditioning and dispensing portion of the station or a **hydrogen** production and dispensing portion of the station. The latter includes a heat exchanger for warming the LNG and a steam reformer which produces **hydrogen** and carbon dioxide from the warmed LNG. The **hydrogen** is compressed and then either **stored** or dispensed to a vehicle powered by a fuel cell. The carbon dioxide may optionally be further processed and **stored** for future use.

IT 1333-74-0P, **Hydrogen**, uses
(fuel cell refueling station and system)

IC ICM H01M008-00

ICS H01M008-06; F17C007-02; F17C007-04; B01D053-62; C10K003-04

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST fuel cell refueling station; **hydrogen** supply station fuel cell system

IT Compressors

Dispensing apparatus

Fuel cells

Heat exchangers

Vehicles

(fuel cell refueling station and system)

IT 1333-74-0P, **Hydrogen**, uses

(fuel cell refueling station and system)

L96 ANSWER 3 OF 66 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 2007:200365 HCAPLUS

DOCUMENT NUMBER: 146:209864

TITLE: Mobile **hydrogen** service station

INVENTOR(S): Kederer, Tobias; Tomforde, Tobias

PATENT ASSIGNEE(S): Linde Aktiengesellschaft, Germany

SOURCE: PCT Int. Appl., 15pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: German

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2007019948	A1	20070222	WO 2006-EP7334	20060725
W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,				

GB, GD, GE, GH, GM, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG,
KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LV, LY, MA,
MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH,
PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM,
TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW
RW: AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU,
IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR,
BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD,
TG, BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,
ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM

DE 102005039202

A1

20070222

DE 2005-102005039202

20050818

PRIORITY APPLN. INFO.:

DE 2005-102005039202A

20050818

ED Entered STN: 23 Feb 2007

AB A **hydrogen** service station for filling a motor vehicle with a gaseous or liquid **hydrogen** has (a) a reservoir for storing a liquefied **hydrogen**, (b) a liquefied **hydrogen** dispensing unit which is supplied with liquefied **hydrogen** from the reservoir, (c) a compressor, an evaporator mounted upstream of the compressor, a heating system mounted downstream of the compressor, an intermediate reservoir which is mounted downstream of the heating system and used for intermediately storing compressed gaseous **hydrogen**, (d) a gaseous **hydrogen** dispensing unit mounted downstream of the intermediate reservoir, (e) a fuel cell which is supplied with gaseous **hydrogen** and which supplies power to the compressor, and (f) a control unit which is powered by the fuel cell and used for controlling the compressor, gaseous **hydrogen** dispensing unit, and/or the liquefied **hydrogen** dispensing unit.

IT 1333-74-0, **Hydrogen**, uses(fuel; mobile **hydrogen** service station)

CC 52:3 (Electrochemical, Radiational, and Thermal Energy Technology)

ST mobile **hydrogen** service station compressor evaporator fuel cell

IT Compressors

Control apparatus

Dispensing apparatus

Evaporators

Fuel cells

Heating systems

(mobile **hydrogen** service station)IT 1333-74-0, **Hydrogen**, uses(fuel; mobile **hydrogen** service station)

REFERENCE COUNT:

9

THERE ARE 9 CITED REFERENCES AVAILABLE FOR
THIS RECORD. ALL CITATIONS AVAILABLE IN THE
RE FORMAT

L96 ANSWER 4 OF 66 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 2007:193198 HCAPLUS

DOCUMENT NUMBER: 146:255327

TITLE: Energy stations

INVENTOR(S): Matsuo, Shiro; Otaka, Akifumi; Ballantine, Arne

PATENT ASSIGNEE(S): USA

SOURCE: U.S. Pat. Appl. Publ., 20pp.

CODEN: USXXCO

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 2007042241	A1	20070222	US 2005-205391	20050817
PRIORITY APPLN. INFO.:			US 2005-205391	20050817

ED Entered STN: 22 Feb 2007

AB An energy station includes a generating unit and a sep. remotely located dispensing unit. The generating unit includes a housing having an electrolyzer for generating **hydrogen** and a **storage** unit for **storing hydrogen** from the electrolyzer. The dispensing unit includes a housing for dispensing **hydrogen** from the generating unit. The generating unit is located at a first location and the dispensing unit is located at a second location away from the first location. For example, the generating unit may be located outside the building and the dispensing unit may be located inside a garage. Also disclosed is a generating unit having a fuel cell for supplying electricity to the building and a heat exchanger for supplying heat to the building.

IT 1333-74-0, **Hydrogen**, uses

(energy station for generating **hydrogen** for vehicles and electricity and heat for a building, and which includes a generating unit and a sep. remotely located dispensing unit)

INCL 429021000; 429024000; 204242000

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST **hydrogen** vehicle refueling fuel cell electricity heating building; electrolyzer fuel cell **hydrogen** remote dispensing

IT Buildings

Dispensing apparatus

Electric energy

Electrolytic cells

Fuel cells

Heat exchangers

Heating

Heating systems

(energy station for generating **hydrogen** for vehicles and electricity and heat for a building, and which includes a generating unit and a sep. remotely located dispensing unit)

IT Buildings

(residential; energy station for generating **hydrogen** for vehicles and electricity and heat for a building, and which includes a generating unit and a sep. remotely located dispensing unit)

IT 1333-74-0, **Hydrogen**, uses

(energy station for generating **hydrogen** for vehicles and electricity and heat for a building, and which includes a generating unit and a sep. remotely located dispensing unit)

L96 ANSWER 5 OF 66 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 2007:175026 HCAPLUS

DOCUMENT NUMBER: 146:209656

TITLE: **Hydrogen** fuel generator

INVENTOR(S): Fisher, Tobin Joseph; Thomas, Jesse

PATENT ASSIGNEE(S): Ardica Technologies Inc., USA

SOURCE: U.S. Pat. Appl. Publ., 12pp.

CODEN: USXXCO

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 2007036711	A1	20070215	US 2005-202598	20050811
WO 2007021934	A2	20070222	WO 2006-US31377	20060811

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW

RW: AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG, BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM

PRIORITY APPLN. INFO.: US 2005-202598 A 20050811

ED Entered STN: 16 Feb 2007

AB A **hydrogen** gas generator generates **hydrogen** gas by mixing two reactants. The generator has a reaction chamber for receiving a solid reactant. The chamber has a reaction product separator impermeable to the solid reactant and a biasing means, especially a spring, for biasing reactant products against the separator. The generator also has a liquid reactant dispenser, especially a bag, for **storing** a liquid reactant and is fluidly coupled to the reaction chamber, such that dispensed liquid reactant reacts with the solid reactant in the reaction chamber to produce **hydrogen** gas and a waste product that are substantially permeable through the separator. The generator also has a product **collector** coupled to the reaction chamber for **collecting** **hydrogen** gas and waste product that have passed through the separator. The solid reactant is sodium borohydride which is compacted into a pill form. The liquid reactant is a citric acid solution having a pH of ≤ 2 .

IT 1333-74-0P, **Hydrogen**, preparation
(**hydrogen** fuel generator)

INCL 423648100; 422232000

CC 52-1 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 49

ST **hydrogen** generator sodium borohydride citric acid fuel cell

IT **Dispensing apparatus**
Fuel cells

Gas generators

Membranes, nonbiological

(**hydrogen** fuel generator)

IT 1333-74-0P, **Hydrogen**, preparation
(**hydrogen** fuel generator)

IT 77-92-9, Citric acid, reactions 16940-66-2, Sodium borohydride
(**hydrogen** fuel generator)

L96 ANSWER 6 OF 66 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 2006:1123525 HCAPLUS

DOCUMENT NUMBER: 145:457612

TITLE: System for dispensing **hydrogen** to a vehicle

INVENTOR(S): Khan, Amjad; Maloney, Thomas M.; Moulthrop, Lawrence Clinton; Kowalski, Michael Thomas; White, Erik James

PATENT ASSIGNEE(S): USA

SOURCE: U.S. Pat. Appl. Publ., 5pp.
 CODEN: USXXCO
 DOCUMENT TYPE: Patent
 LANGUAGE: English
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 2006236608	A1	20061026	US 2005-112608	20050422
PRIORITY APPLN. INFO.:			US 2005-112608	20050422

ED Entered STN: 27 Oct 2006

AB A system for delivering **hydrogen** to a vehicle is provided which includes a first **hydrogen** generator coupled to a first compressor. A second **hydrogen** generator is also provided that produces **hydrogen** gas at a pressure at least 2 times that produced by the first generator. Coupled to the second **hydrogen** generator is a second compressor that increases the pressure of the **hydrogen** gas produced to a desired delivery pressure. A **storage** vessel is coupled to both first and second compressors to **store** the **hydrogen** gas at a desired pressure level prior to dispensing.

IT 1333-74-0P, **Hydrogen**, uses
 (system for dispensing **hydrogen** to vehicle)

INCL 048190000

CC 52-1 (Electrochemical, Radiational, and Thermal Energy Technology)
 Section cross-reference(s): 47, 72

ST vehicle **hydrogen** dispensing system

IT Compressors

(diaphragm; system for dispensing **hydrogen** to vehicle)

IT Compressors

(piston; system for dispensing **hydrogen** to vehicle)

IT Electrolytic cells

(polymer electrolyte membrane; system for dispensing **hydrogen** to vehicle)

IT Fuel cells

(proton exchange membrane; system for dispensing **hydrogen** to vehicle)

IT Fuel gas manufacturing

(reforming; system for dispensing **hydrogen** to vehicle)

IT Reforming apparatus

(steam; system for dispensing **hydrogen** to vehicle)

IT Biomass

Containers

Diesel fuel

Dispensing apparatus

Jet aircraft fuel

Photolysis

Reforming apparatus

Vehicles

(system for dispensing **hydrogen** to vehicle)

IT Gasoline

Hydrocarbons, processes

(system for dispensing **hydrogen** to vehicle)

IT 74-82-8, Methane, processes

(steam reforming; system for dispensing **hydrogen** to vehicle)

IT 67-56-1, Methanol, processes 74-98-6, Propane, processes

7732-18-5, Water, processes

(system for dispensing **hydrogen** to vehicle)
 IT 1333-74-0P, **Hydrogen**, uses
 (system for dispensing **hydrogen** to vehicle)

L96 ANSWER 7 OF 66 HCAPLUS COPYRIGHT 2007 ACS on STN
 ACCESSION NUMBER: 2006:540933 HCAPLUS
 DOCUMENT NUMBER: 144:492000
 TITLE: Mobile **hydrogen** delivery system
 INVENTOR(S): Li, Yang; Stahl, Charles; Stetson, Ned; Bovinich, Daniel
 PATENT ASSIGNEE(S): Texaco Ovonic Hydrogen Systems LLC, USA; Ovonic Hydrogen Systems, LLC
 SOURCE: U.S. Pat. Appl. Publ., 9 pp.
 CODEN: USXXCO
 DOCUMENT TYPE: Patent
 LANGUAGE: English
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 2006118201	A1	20060608	US 2004-5582	20041206
US 7093626	B2	20060822		
PRIORITY APPLN. INFO.:			US 2004-5582	20041206

ED Entered STN: 09 Jun 2006

AB A mobile **hydrogen** delivery system for delivering a compressed stream of **hydrogen** at pressures up to 15000 psig. The mobile **hydrogen** delivery system includes a **hydrogen** compression system, a gaseous **hydrogen** storage system, and a delivery system for supplying **hydrogen** to end users. A mobile platform supports the **hydrogen** compression system, the gaseous **hydrogen** storage system, and the dispensing system. The mobile platform may be any platform, such as a trailer, capable of being pulled, pushed, or supported by any type of vehicle, such a truck, train, boat, tractor, etc.

IT 1333-74-0, **Hydrogen**, uses
 (mobile **hydrogen** delivery system)

INCL 141231000

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST mobile **hydrogen** delivery system

IT Compression

Compressors

Delivery apparatus

Dispensing apparatus

Electrolytic cells

Fuel cells

Solar cells

Storage

(mobile **hydrogen** delivery system)

IT Hydrides

(mobile **hydrogen** delivery system)

IT 7440-21-3, Silicon, uses

(amorphous; mobile **hydrogen** delivery system)

IT 1333-74-0, **Hydrogen**, uses

(mobile **hydrogen** delivery system)

L96 ANSWER 8 OF 66 HCAPLUS COPYRIGHT 2007 ACS on STN
 ACCESSION NUMBER: 2006:970240 HCAPLUS

DOCUMENT NUMBER: 145:339118
 TITLE: Submersible vehicle power plant
 INVENTOR(S): Kalmykov, A. N.; Sen'kov, A. P.; Shamanov, N. P.
 PATENT ASSIGNEE(S): GOUVPO "Sankt-Peterburgskii Gosudarstvennyi
 Morskoi Tekhnicheskii Universitet", Russia
 SOURCE: Russ., 7pp.
 CODEN: RUXXE7
 DOCUMENT TYPE: Patent
 LANGUAGE: Russian
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
RU 2284078	C1	20060920	RU 2005-109218	20050330
PRIORITY APPLN. INFO.:			RU 2005-109218	20050330

ED Entered STN: 20 Sep 2006

AB The invention provides a submersible-vehicle power plant incorporating an electrochem. generator. The proposed power plant has a **hydrogen** producer unit by a water-activated chemical current supply with a **gas** cushion, incorporating a soluble metal anode made, for instance, of magnesium or magnesium base alloy and an inert catalytic cathode, both installed in a pressurized **tank** filled with an aqueous solution of electrolyte (or seawater) that accommodates an electrolyte level sensor and communicates with a water supply line and a solid-phase reaction product **accumulating** line; and a **gas** cushion of the water-activated chemical elec. current supply communicates with a **hydrogen** outlet line; a solid-phase reaction product **accumulating** line communicates with solid-phase reaction product **accumulation** volume. The electrochem. generator communicates with the oxygen feed line which communicates with the oxygen generation unit and the **hydrogen** supply line, and the latter communicates with the **hydrogen** **storage** and preparation unit and water drain line; the latter communicates with a water **accumulation tank** and with a **hydrogen** supply line which communicates in its turn with a **hydrogen** outlet line incorporating a **hydrogen** pressure sensor, adjustable **hydrogen** supply valve, **hydrogen** pressure reducer, and a **hydrogen** moisture separator communicating through the water **accumulating** line with a 2nd water inlet **accumulation tank**, water supply line, as well as with an adjustable pump and controlled water supply valve installed in tandem in this line. The elec. power leads of the water-activated chemical elec. current supply and those of the electrochem. generator are connected to inputs of voltage converter, power leads of converter are connected to user. This power supply design reduced the required mass and warm-up period, and enhanced safety of the power plant.

IT 1333-74-0P; **Hydrogen**, uses

(submersible vehicle power plant)

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST submersible vehicle power plant **hydrogen** generation

fuel cell; sacrificial magnesium anode

hydrogen generation **fuel cell** power supply

IT Separators

(**hydrogen**-water; submersible vehicle power plant)

IT **Fuel cell** anodes

(sacrificial; submersible vehicle power plant)

IT **Fuel cells**

Pipes and Tubes

Pressure sensors

Pumps

Seawater

Tanks (containers)

Valves

(submersible vehicle power plant)

IT 1333-74-0P, **Hydrogen**, uses

(submersible vehicle power plant)

L96 ANSWER 9 OF 66 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 2006:25313 HCAPLUS

DOCUMENT NUMBER: 144:111265

TITLE: Power plant of an underwater apparatus with
electro-chemical generatorINVENTOR(S): Barsukov, O. A.; Glukhikh, I. N.; Korol'kov, V.
I.; Koshelev, A. V.; Mel'nichuk, S. P.; Sokolov,
B. A.; Chelyaev, V. F.; Shcherbakov, A. N.PATENT ASSIGNEE(S): OAO "Raketno-Kosmicheskaya Korporatsiya "Energiya"
im. S. P. Koroleva", RussiaSOURCE: Russ., 6 pp.
CODEN: RUXXE7

DOCUMENT TYPE: Patent

LANGUAGE: Russian

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
RU 2267836	C2	20060110	RU 2003-136942	20031224
PRIORITY APPLN. INFO.:			RU 2003-136942	20031224

ED Entered STN: 11 Jan 2006

AB An **hydrogen**-oxygen fuel cell for underwater apparatus is provided. The power plant of an underwater apparatus has a chemical reactor, which is connected to a **hydrogen accumulator** [**storage** compartment] through a gas purification block, an electro-chemical generator, which is pneumatically connected to a block for **storing** cryogenic oxygen, and to the **hydrogen storage** section, while being hydraulically connected to a reservoir for distilled water, a tank for milled aluminum, connected through a dosage device for powder-like substances to the chemical reactor; a reservoir for **accumulation** of fluid reaction products, which is connected to the chemical reactor; a reservoir with alkali solution. The **hydrogen accumulator/storage** compartment is a pressurized gas tank, and the power plant addnl. includes a liquid mixer with a heating device and a liquid level indicator which is connected to the chemical reactor, while the liquid mixer is connected to the reservoir with the alkali solution and to the reservoir for distilled water, and also a heat-exchange heating device is mounted in the aforementioned reservoir for **accumulating** liquid reaction products. The **hydrogen accumulator/storage** compartment can be mounted together with the electro-chemical generator in a pressurized space, equipped with a fire and explosion prevention system. This design affords a higher speed of operation concerning supplying **hydrogen** to the electro-chemical generator, a controllable launch time of chemical reactor, thus, increased controllability of **hydrogen** generation process onboard the underwater apparatus and increased level of fire and explosion safety during operation of power

plant.
 IT 1333-74-0P, **Hydrogen**, uses
 (power plant of underwater apparatus with electro-chemical generator)
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 Section cross-reference(s): 59
 ST power plant underwater app elec generator hydrolysis **hydrogen**
 prodn; reaction product **storage** heating aluminum caustic
 hydrolysis **hydrogen** prodn
 IT Control apparatus
 (for oxygen and **hydrogen** flow control and temperature control;
 power plant of underwater apparatus with electro-chemical generator)
 IT **Fuel cells**
 (for underwater apparatus; power plant of underwater apparatus with
 electro-chemical generator)
 IT **Dispensing apparatus**
 Distributing apparatus
 Heat exchangers
 Hydrolysis
 Mixers (processing apparatus)
 Pipes and Tubes
 Pumps
 Tanks (containers)
 (power plant of underwater apparatus with electro-chemical generator)
 IT Tanks (containers)
 (pressure tanks, for **hydrogen storage**; power
 plant of underwater apparatus with electro-chemical generator)
 IT 1333-74-0P, **Hydrogen**, uses 7782-44-7P, Oxygen,
 uses
 (power plant of underwater apparatus with electro-chemical generator)

L96 ANSWER 10 OF 66 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 2006:144220 HCAPLUS

DOCUMENT NUMBER: 144:195315

TITLE: Apparatus for **fuel cell** system
 power conversion with mechanism for cooling sound
 absorber

INVENTOR(S): Hirose, Hideki

PATENT ASSIGNEE(S): Nissan Motor Co., Ltd., Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 8 pp.

CODEN: JKXXAF

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2006049213	A	20060216	JP 2004-231280	20040806
PRIORITY APPLN. INFO.:			JP 2004-231280	20040806

ED Entered STN: 16 Feb 2006

AB The title apparatus is equipped with a **pipeline** for supplying H
 to the **fuel cell** from a high-pressure H
gas tank via a valve and a sound absorber attached
 on inner wall of a **housing** for **storing**
 the DC/DC or DC/AC converter, where the **pipeline** is
 contacted to the sound absorber. The apparatus suppresses temperature increase
 of the sound absorber without installing a cooling device.

IT 1333-74-0, **Hydrogen**, uses
 (**hydrogen pipeline** for cooling sound absorber)

in **fuel cell** power conversion apparatus)
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 ST **hydrogen pipeline** cooling sound absorber
fuel cell power converter
 IT Cooling
 Energy converters
Fuel cells
 Sound insulators
 (**hydrogen pipeline** for cooling sound absorber
 in **fuel cell** power conversion apparatus)
 IT Polypropene fibers, uses
 (sound absorbers; **hydrogen pipeline** for cooling
 sound absorber in **fuel cell** power conversion
 apparatus)
 IT 25085-53-4, Isotactic polypropylene
 (fiber; **hydrogen pipeline** for cooling sound
 absorber in **fuel cell** power conversion apparatus)
 IT 1333-74-0, Hydrogen, uses
 (**hydrogen pipeline** for cooling sound absorber
 in **fuel cell** power conversion apparatus)

L96 ANSWER 11 OF 66 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 2006:1039421 HCAPLUS

DOCUMENT NUMBER: 145:359014

TITLE: Enhancement of heat transfer in **hydrogen**
storage tank using
hydrogen absorbing alloy (improvement of
 metal hydride **tank** design for high
 charging rate)

AUTHOR(S): Mitsutake, Yuichi; Monde, Masanori; Oyakawa,
 Kenshun; Uchida, Hiroshi; Tsunokake, Shigeru;
 Fuura, Tatsuya

CORPORATE SOURCE: Department of Mechanical Engineering, Saga
 University, 1 Honjo-machi, Saga-shi, Saga,
 840-8502, Japan

SOURCE: Nippon Kikai Gakkai Ronbunshu, B-hen (2006),
 72(719), 1645-1651

CODEN: NKGBDD; ISSN: 0387-5016

PUBLISHER: Nippon Kikai Gakkai

DOCUMENT TYPE: Journal

LANGUAGE: Japanese

ED Entered STN: 06 Oct 2006

AB A **hydrogen storage system** using metal
 hydride (MH) has several problems to be solved before practical use.
 Among of them a long charging time required due to the poor heat
 transmission in MH bed during exoergic hydride forming reaction is
 essential for the **hydrogen storage system**
 of **fuel cell** elec. vehicles. Four small
tanks (effective **hydrogen** capacity 1.25 Nm³) using a
 La-Ni based AB 5 type **hydrogen storage** alloy were
 made by way of trial to attain the charging time within 10 min
 absorbing 80% of effective **hydrogen** capacity. The expts.
 were carried out to evaluate effects of thermal design of the
tank, coolant condition on **hydrogen** absorption rate.
 Calcn. of the process was done to improve performance of heat transfer
 in MH bed with addnl. thermal fins and rearrangement of coolant
channels. The final version of the **tank** satisfied
 the required charging time even for higher coolant temperature of 21°
 which reduces chiller load of a **hydrogen** station.

IT 1333-74-0, Hydrogen, processes

(enhancement of heat transfer in **hydrogen storage tank** using **hydrogen** absorbing alloy)

CC 48-5 (Unit Operations and Processes)
Section cross-reference(s): 47, 52

ST heat transfer enhancement **hydrogen storage metal hydride tank**

IT Heat transfer
 Tanks (containers)
 (enhancement of heat transfer in **hydrogen storage tank** using **hydrogen** absorbing alloy)

IT Hydrides
 (enhancement of heat transfer in **hydrogen storage tank** using **hydrogen** absorbing alloy)

IT Electric vehicles
 (**fuel cell**; enhancement of heat transfer in **hydrogen storage tank** using **hydrogen** absorbing alloy)

IT 12142-63-1, La, Ni
 (enhancement of heat transfer in **hydrogen storage tank** using **hydrogen** absorbing alloy)

IT 1333-74-0, **Hydrogen**, processes
 (enhancement of heat transfer in **hydrogen storage tank** using **hydrogen** absorbing alloy)

L96 ANSWER 12 OF 66 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 2005:429137 HCAPLUS

DOCUMENT NUMBER: 142:448689

TITLE: Metal hydride canister apparatus

INVENTOR(S): Wu, Chou-zong; Hsu, Chi-tang

PATENT ASSIGNEE(S): Industrial Technology Research Institute, Taiwan

SOURCE: U.S. Pat. Appl. Publ., 11 pp.

CODEN: USXXCO

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 2005103196	A1	20050519	US 2004-805271	20040322
TW 223905	B	20041111	TW 2003-92132204	20031118
PRIORITY APPLN. INFO.:			TW 2003-92132204	A 20031118

ED Entered STN: 20 May 2005

AB A metal hydride canister is described having structures capable of discharging **hydrogen gas** uniformly and exchanging heat effectively, comprising a **shell** having a joint arranged in a central hole located on top of the **shell**, and two via holes arranged resp. at a **side** of the central hole; a filtering rod connecting to the joint; a **pipe** having a first end, a second end and a middle section between the first end and the second end; and a metal hydride **stored** inside the **shell**; where, the first end and the second end of the **pipe** pass the corresponding via hole in resp., and the middle section of the **pipe** forms a twin spiral structure **wrapping** around the filtering rod, the middle section having a first loop interconnecting to a second loop. The filtering rod can be a hollow rod extending toward the bottom of the **shell**, and is welded on the joint that is further welded to the central hole, in addition, the first end and the second end of the **pipe** are

welded onto the corresponding via holes and are exposed to the outside of the **shell**; and the first loop and the second loop of the middle section can have equal diams. or different diams.

IT 1333-74-0, **Hydrogen**, uses
(metal hydride canister apparatus)

IC ICM B01D053-02

INCL 096134000

CC 47-7 (Apparatus and Plant Equipment)
Section cross-reference(s): 49, 52

IT Delivery apparatus

Fuel cells

Valves

(metal hydride canister apparatus)

IT 1333-74-0, **Hydrogen**, uses
(metal hydride canister apparatus)

L96 ANSWER 13 OF 66 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 2005:394617 HCAPLUS

DOCUMENT NUMBER: 142:433106

TITLE: Method and system for dispensing pelletized fuel
for use with a fuel cell

INVENTOR(S): Harding, Philip H.; Barinaga, Louis C.; Greeven,
John C.; McClelland, Paul H.; Tsang, Joseph W.;
Gore, Makarand

PATENT ASSIGNEE(S): Hewlett-Packard Development Company, L.P., USA

SOURCE: U.S. Pat. Appl. Publ., 28 pp.

CODEN: USXXCO

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 2005095470	A1	20050505	US 2003-697343	20031030
US 7128997	B2	20061031		
PRIORITY APPLN. INFO.:			US 2003-697343	20031030

ED Entered STN: 09 May 2005

AB Representative embodiments provide for a fuel activation device including a fuel **storage** chamber configured to **store** a plurality of fuel pellets arranged as a stack. A fuel **dispensing device** is configured to transport a fuel pellet to a fuel activation chamber. A spring is configured to advance the fuel pellets toward the fuel **dispensing device** as one or more fuel pellets are removed from the stack. A fuel initiator is configured to activate a release of **hydrogen** gas from the transported fuel pellet. The fuel activation device is configured to provide the **hydrogen** gas to a fuel cell through a gas vent. A method is provided including providing a plurality of fuel pellets arranged as a spring-loaded stack, transporting a fuel pellet from the stack, activating a release of **hydrogen** gas from the transported fuel pellet, and providing the **hydrogen** gas to a fuel cell.

IT 1333-74-0P, **Hydrogen**, uses
(method and system for dispensing pelletized fuel for use with fuel cell)

IC ICM H01M008-04

ICS B65D085-00; B67D005-00

INCL 429013000; X20-6 .6; X22-2 .3

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
IT **Dispensing apparatus**
Fuel briquets
Fuel cells
(method and system for dispensing pelletized fuel for use with fuel cell)
IT 1333-74-0P, **Hydrogen**, uses
(method and system for dispensing pelletized fuel for use with fuel cell)
REFERENCE COUNT: 17 THERE ARE 17 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L96 ANSWER 14 OF 66 HCAPLUS COPYRIGHT 2007 ACS on STN
ACCESSION NUMBER: 2006:171615 HCAPLUS
DOCUMENT NUMBER: 145:474588
TITLE: 700 Bar **hydrogen cylinder**
design, testing and certification
AUTHOR(S): Duncan, M.
CORPORATE SOURCE: Dynetek Industries Ltd., Calgary, AB, T2B 3N7, Can.
SOURCE: Fuel Cell and Hydrogen Technologies, Proceedings of the International Symposium on Fuel Cell and Hydrogen Technologies, 1st, Calgary, AB, Canada, Aug. 21-24, 2005 (2005), 485-496. Editor(s): Ghosh, Dave. Canadian Institute of Mining, Metallurgy and Petroleum: Montreal, Que.
CODEN: 69HVBV; ISBN: 1-894475-61-5
DOCUMENT TYPE: Conference
LANGUAGE: English
ED Entered STN: 24 Feb 2006
AB Lightwt., high-pressure **cylinders** for compressed H **storage** are essential components for **fuel cell** vehicles. **Storage** volume and mass are two key considerations. Current on-board H **storage systems** are based on a maximum pressure of 350 bar. While 350 bar systems are excellent solns. for many applications, some situations require higher **storage** densities due to space restrictions. As a result, significant research and development work has been expended by **cylinder** manufacturers, systems providers, testing agencies and automotive manufacturers to develop 700 bar **systems** with reduced **storage** vols. Dynetek Industries Ltd. has proactively developed several 700 bar **storage cylinders** based on a seamless Al liner over **wrapped** with a carbon fiber composite. This paper presents the challenges and processes involved in the design, testing and certification for Dynetek Industries Ltd. 700 bar **cylinders**. This paper also provides reasoning for further volume and mass optimization of compressed H **cylinders** through the establishment of realistic **cylinder** usage parameters in stds. The overly conservative fill life requirement for **cylinders** is examined
IT 1333-74-0, **Hydrogen**, processes
(high pressure **hydrogen cylinder** design and testing and certification)
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
ST high pressure **hydrogen cylinder** design testing certification
IT Carbon fibers, uses
(composites; high pressure **hydrogen cylinder** design and testing and certification)

IT **Cylinders**
 Design
Fuel cells
 Optimization
 Pressure
 (high pressure **hydrogen cylinder** design and
 testing and certification)
 IT 7429-90-5, Aluminum, uses
 (high pressure **hydrogen cylinder** design and
 testing and certification)
 IT 1333-74-0, **Hydrogen**, processes
 (high pressure **hydrogen cylinder** design and
 testing and certification)

REFERENCE COUNT: 8 THERE ARE 8 CITED REFERENCES AVAILABLE FOR
 THIS RECORD. ALL CITATIONS AVAILABLE IN THE
 RE FORMAT

L96 ANSWER 15 OF 66 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 2004:1126920 HCAPLUS

DOCUMENT NUMBER: 142:77666

TITLE: **Storage** system and method for supplying
hydrogen to a polymer membrane fuel cell

INVENTOR(S): Christie, Gervase Maxwell; Volk, James Joseph;
 Fagan, Timothy James

PATENT ASSIGNEE(S): USA

SOURCE: U.S. Pat. Appl. Publ., 7 pp.

CODEN: USXXCO

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 2004258965	A1	20041223	US 2003-600605	20030623
CA 2530537	A1	20050106	CA 2004-2530537	20040604
WO 2005001957	A2	20050106	WO 2004-US17700	20040604
WO 2005001957	A3	20060216		
W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW RW: BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				
DE 112004001046	T5	20060511	DE 2004-112004001046	20040604
PRIORITY APPLN. INFO.:			US 2003-600605	A 20030623
			WO 2004-US17700	W 20040604

ED Entered STN: 24 Dec 2004

AB A **hydrogen storage** system and method having a main
hydrogen storage site that contains a sufficient
 amount of **hydrogen** for a fuel cell employing a polymer
 membrane to generate power in accordance with a predetd. elec. power

requirement. A main **storage** site is provided to **store** and supply **hydrogen** to meet the elec. power requirement for the fuel cell. An auxiliary **hydrogen storage** site contains a sufficient amount of **hydrogen** to allow the fuel cell to operate on a scheduled basis that is required to maintain the polymer membrane hydrated. A manifold connects the main and auxiliary **hydrogen storage** sites and has an outlet to deliver **hydrogen** to the fuel cell. The manifold allows the auxiliary **hydrogen storage** site to be renewed independently of the main **storage** site and has a flow control network to allow the fuel cell to draw **hydrogen** from the auxiliary **hydrogen storage** site for maintenance purposes without use of the **hydrogen** from the main **hydrogen storage** site.

- IT 1333-74-0, **Hydrogen**, uses
(**storage** system and method for supplying **hydrogen** to polymer membrane fuel cell)
- IC ICM H01M008-06
ICS H01M008-04; H01M008-10
- INCL 429019000; 429038000; 429025000; 429017000; 429030000
- CC 52-3 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 47, 49
- ST **storage hydrogen** dispensing polymer membrane fuel cell gas cylinder; carbon fiber wrapped compressed gas cylinder manifold pressure regulator
- IT Reinforced plastics
(carbon fiber-reinforced, gas **storage** cylinder; **storage** system and method for supplying **hydrogen** to polymer membrane fuel cell)
- IT Pipes and Tubes
(fittings; **storage** system and method for supplying **hydrogen** to polymer membrane fuel cell)
- IT Carbon fibers, uses
(gas cylinders wrapped with; **storage** system and method for supplying **hydrogen** to polymer membrane fuel cell)
- IT Cylinders
(gas, for **hydrogen**; **storage** system and method for supplying **hydrogen** to polymer membrane fuel cell)
- IT Membranes, nonbiological
(hydrated polymer; **storage** system and method for supplying **hydrogen** to polymer membrane fuel cell)
- IT Control apparatus
(pressure regulator; **storage** system and method for supplying **hydrogen** to polymer membrane fuel cell)
- IT Pipes and Tubes
(pressure; **storage** system and method for supplying **hydrogen** to polymer membrane fuel cell)
- IT Dispensing apparatus
Fuel cells
Valves
(**storage** system and method for supplying **hydrogen** to polymer membrane fuel cell)
- IT 1333-74-0, **Hydrogen**, uses
(**storage** system and method for supplying **hydrogen** to polymer membrane fuel cell)

L96 ANSWER 16 OF 66 HCAPLUS COPYRIGHT 2007 ACS on STN
ACCESSION NUMBER: 2004:372416 HCAPLUS
DOCUMENT NUMBER: 140:377327

TITLE: Systems and methods for screening and optimization of solid oxide fuel cell materials
 INVENTOR(S): Lemmon, John P.; Jordan, Tracey
 PATENT ASSIGNEE(S): General Electric Company, USA
 SOURCE: U.S. Pat. Appl. Publ., 9 pp.
 CODEN: USXXCO
 DOCUMENT TYPE: Patent
 LANGUAGE: English
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 2004084374	A1	20040506	US 2002-287751	20021104
US 6818134	B2	20041116		
IN 2003DE01302	A	20051014	IN 2003-DE1302	20031022
CA 2446340	A1	20040504	CA 2003-2446340	20031023
EP 1416270	A1	20040506	EP 2003-256866	20031030
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, SK				
JP 2004288612	A	20041014	JP 2003-371452	20031031
CN 1505195	A	20040616	CN 2003-10120347	20031104
PRIORITY APPLN. INFO.:			US 2002-287751	A 20021104

ED Entered STN: 07 May 2004

AB Systems and methods for high-throughput fabrication and evaluation of electrode and electrolyte material performance for solid oxide fuel cells. A system comprising a substrate, an auto-sampler operable for simultaneously controlling the flow rates of ≥ 2 solid oxide fuel cell components, a delivery apparatus, a mass flow controller, an x-y motion stage, and a microprocessor operable for controlling the system. A method comprising providing a library of samples, continuously and controllably supplying desired amts. of the samples to a liquid chromatog. system where a multi-compositional mixture is formed, serially loading the multi-compositional mixture into a common sprayer, serially and distributively spraying the multi-compositional mixture onto a surface of a substrate, forming a discrete or continuous gradient array of the mixture reacted on the substrate, and evaluating the performance of the mixture for use in solid oxide fuel cells.

IT 1333-74-0, **Hydrogen**, processes
 (systems and methods for screening and optimization of solid oxide fuel cell materials)

IC ICM B01D015-08

INCL 210656000; 210198200

CC 48-4 (Unit Operations and Processes)

Section cross-reference(s): 79, 80

ST system high throughput screening optimization solid oxide fuel cell; chromatograph **dispensing app** spraying nebulization concn gradient masking combinational

IT Tanks (containers)
 (raw materials **storage**; systems and methods for screening and optimization of solid oxide fuel cell materials)

IT **Fuel cell electrodes**

Fuel cell electrolytes

(screening materials for; systems and methods for screening and optimization of solid oxide fuel cell materials)

IT **Fuel cells**

(solid oxide, optimization of materials for; systems and methods for screening and optimization of solid oxide fuel cell materials)

IT 1333-74-0, **Hydrogen**, processes

(systems and methods for screening and optimization of solid oxide fuel cell materials)

REFERENCE COUNT: 14 THERE ARE 14 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L96 ANSWER 17 OF 66 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 2004:958724 HCAPLUS

DOCUMENT NUMBER: 142:243582

TITLE: Coating aluminum or chromium with corrosion preventing film on separator for molten carbonate **fuel cell** using pack cementation

INVENTOR(S): Ha, Heung Yong; Han, Jong Hui; Hong, Seong An; Lim, Tae Hun; Nam, Seok U.; Oh, In Hwan; Ryu, Bo Hyeon; Yoon, Seong Pil

PATENT ASSIGNEE(S): Korea Institute of Science and Technology, S. Korea

SOURCE: Repub. Korean Kongkae Taeho Kongbo, No pp. given
CODEN: KRXXA7

DOCUMENT TYPE: Patent

LANGUAGE: Korean

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
-----	-----	-----	-----	-----
KR 2003063676	A	20030731	KR 2002-3925	20020123
PRIORITY APPLN. INFO.:			KR 2002-3925	20020123

ED. Entered STN: 11 Nov 2004

AB A method and a system for coating metal corrosion preventing film on separator for molten carbonate **fuel cells** (MCFC) using pack cementation are provided to easily control thickness of the metal corrosion preventing film and recycle the metal powder by sep. supplying metal powder and metal halide powder and supplying high purity **hydrogen**. In a system for coating a metal corrosion preventing film on stainless steel separator for MCFC using pack cementation, the system comprises reactor in which metal powder contacted separator for MCFC is installed; elec. furnace for heating the reactor; **hydrogen storage tank** for supplying low purity **hydrogen** to the film separation unit; film separation unit in which Pd series film is coated to supply high purity **hydrogen** into the reactor; **gas supply tube** connected to the inside of the reactor to supply high purity **hydrogen** into the reactor; and sublimator which is positioned at the middle of **hydrogen** supply line on the outer part of the reactor, and in which metal halide is contained, the system further comprises ball flow meter for supplying the high purity **hydrogen** in a fixed flow rate, wherein the metal is aluminum or chromium, wherein the reactor is **sealed** by lid and graphite **gasket** so that external **gas** is not penetrated into the reactor, and wherein a space is formed between the **hydrogen** supply **tube** and reactor so that **hydrogen** supplied is exhausted through the space.

IT 1333-74-0, **Hydrogen**, uses

(coating metal with corrosion preventing film on separator for molten carbonate **fuel cell** using pack cementation)

IC ICM C23C010-34

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 56

ST coating corrosion prevention film separator MCFC pack cementation;
molten carbonate **fuel cell** corrosion separator
pack cementation

IT Coating materials
(anticorrosive; coating metal with corrosion preventing film on
separator for molten carbonate **fuel cell** using
pack cementation)

IT Corrosion prevention
Heating
(coating metal with corrosion preventing film on separator for
molten carbonate **fuel cell** using pack
cementation)

IT Halides
(coating metal with corrosion preventing film on separator for
molten carbonate **fuel cell** using pack
cementation)

IT Coating process
(diffusion, pack cementation; coating metal with corrosion
preventing film on separator for molten carbonate **fuel
cell** using pack cementation)

IT Separation
(film; coating metal with corrosion preventing film on separator
for molten carbonate **fuel cell** using pack
cementation)

IT Recycling
(metal; coating metal with corrosion preventing film on separator
for molten carbonate **fuel cell** using pack
cementation)

IT 7429-90-5, Aluminum, uses 7440-47-3, Chromium, uses 7782-42-5,
Graphite, uses 12597-68-1, Stainless steel, uses
(coating metal with corrosion preventing film on separator for
molten carbonate **fuel cell** using pack
cementation)

IT 1333-74-0, **Hydrogen**, uses
(coating metal with corrosion preventing film on separator for
molten carbonate **fuel cell** using pack
cementation)

L96 ANSWER 18 OF 66 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 2003:969341 HCAPLUS
DOCUMENT NUMBER: 140:18409
TITLE: Water dosage of a fuel cell
INVENTOR(S): Gaulhofer, Andreas; Nuessle, Ralf
PATENT ASSIGNEE(S): Ballard Germany GmbH, Germany
SOURCE: Ger. Offen., 14 pp.
CODEN: GWXXBX
DOCUMENT TYPE: Patent
LANGUAGE: German
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
DE 10223353	A1	20031211	DE 2002-10223353	20020525
PRIORITY APPLN. INFO.:			DE 2002-10223353	20020525

ED Entered STN: 12 Dec 2003

AB A water-dosing unit, connected to a water **storage** reservoir,
is used to feed reactants (e.g., fuels) into the anode and/or cathode

chambers of a polymer-electrolyte-membrane fuel cell system. The water dosing unit has a two-phase injection nozzle, in which, for example, 10-50% of the fuel (e.g., H₂ or MeOH) is injected into the water stream into the fuel cell, and the remainder is injected as a sep. stream.

- IT 1333-74-0, **Hydrogen**, processes
(water feedstreams containing; water-dosing unit including two-phase nozzle injection for polymer-electrolyte fuel cells)
- IC ICM H01M008-02
- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
- ST water dosing nozzle fuel cell; **hydrogen** fuel cell water dosing nozzle; methanol fuel cell water dosing nozzle
- IT **Dispensing apparatus**
(dosing; water-dosing unit including two-phase nozzle injection for polymer-electrolyte fuel cells)
- IT **Fuel cells**
(water-dosing unit including two-phase nozzle injection for polymer-electrolyte fuel cells)
- IT 67-56-1, Methanol, processes 1333-74-0, **Hydrogen**, processes
(water feedstreams containing; water-dosing unit including two-phase nozzle injection for polymer-electrolyte fuel cells)

L96 ANSWER 19 OF 66 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 2003:372766 HCAPLUS

DOCUMENT NUMBER: 138:371714

TITLE: Gas production system for high-pressure fuel cell systems

INVENTOR(S): Wiesheu, Norbert

PATENT ASSIGNEE(S): Daimlerchrysler Ag, Germany

SOURCE: Ger. Offen., 8 pp.

CODEN: GWXXBX

DOCUMENT TYPE: Patent

LANGUAGE: German

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
DE 10164755	A1	20030515	DE 2001-10164755	20011025
DE 10164755	B4	20050317		
PRIORITY APPLN. INFO.:			DE 2001-10164755	20011025

ED Entered STN: 15 May 2003

AB The invention concerns a gas production system, which is applied in high-pressure systems at >10 bar, especially in fuel cell systems with H₂ separation membranes. The gas production system comprises at least a **storage** tank for the gas production reactants, a compressor for the pressurization of the reactants in the **storage** tank by using a medium conveyed into the **storage** tank, a gas production component to which the reactants are supplied via supply lines, and a dosing element provided in the supply line between the **storage** tank and the gas production component. The dosing element, especially a dosing pump is suitable for the pressurization of the reactants. A pressure **storage** for the operations medium (especially an inert gas like N₂, or air) is placed behind the compressor so that the reactants of the **storage** tank can be pressurized via the operation medium while the compressor is off-line, and the **storage** tank is under a required pressure.

IC ICM B01J007-00

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 IT **Dispensing apparatus**
 (dosing; gas production system for high-pressure fuel cell systems)
 IT Air
Fuel cells
 Pumps
 (gas production system for high-pressure fuel cell systems)

L96 ANSWER 20 OF 66 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 2002:131181 HCAPLUS
 DOCUMENT NUMBER: 136:186220
 TITLE: Apparatus and method for filling **hydrogen gas** into **hydrogen-absorbing alloy-type hydrogen-storage tank**.
 INVENTOR(S): Kuriiwa, Takahiro; Shimada, Takeaki
 PATENT ASSIGNEE(S): Honda Motor Co., Ltd., Japan
 SOURCE: Jpn. Kokai Tokkyo Koho, 6 pp.
 CODEN: JKXXAF
 DOCUMENT TYPE: Patent
 LANGUAGE: Japanese
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2002054798	A	20020220	JP 2000-244865	20000811
PRIORITY APPLN. INFO.:			JP 2000-244865	20000811

ED Entered STN: 20 Feb 2002

AB The title apparatus includes a H-absorbing alloy-containing filter detachably mounted on the midway of a **pipe** for connecting between the **hydrogen-storage tank** and an H **gas** injection opening. The H-absorbing alloy in the above stated filter has higher H-releasing equilibrium pressure than that of the H-absorbing alloy in the **hydrogen-storage tank** at the same temperature. The H-absorbing alloy in the filter can be TiMn1.5, TiCr2, LaNi5, etc. The H-absorbing alloy in the **hydrogen-storage tank** can be Ti-Cr-V, etc. The apparatus is used for supplying H to **fuel cells** of elec. automobiles, etc.

IT 1333-74-0, **Hydrogen**, processes
 (filling of; apparatus and method for filling **hydrogen gas** into **hydrogen-absorbing alloy-type hydrogen-storage tank**)

IC ICM F17C011-00
 ICS C01B003-00; F17C005-06; F17C013-02; H01M008-04

CC 49-1 (Industrial Inorganic Chemicals)
 Section cross-reference(s): 51, 52, 56

ST **hydrogen** filling app filter **hydrogen storage tank**; equil pressure **hydrogen** releasing **hydrogen** absorbing alloy; **fuel cell** elec automobile **hydrogen** filling app filter **tank**

IT Electric vehicles
 (automobiles, **fuel cells** for, **hydrogen** for; apparatus and method for filling **hydrogen gas** into **hydrogen-absorbing alloy-type hydrogen-storage tank**)

IT Automobiles

- (elec., fuel cells for, hydrogen for; apparatus and method for filling hydrogen gas into hydrogen-absorbing alloy-type hydrogen-storage tank)
- IT Fuel cells
(hydrogen for; apparatus and method for filling hydrogen gas into hydrogen-absorbing alloy-type hydrogen-storage tank)
- IT Filters
(hydrogen-absorbing alloy containing; apparatus and method for filling hydrogen gas into hydrogen-absorbing alloy-type hydrogen-storage tank)
- IT Alloys, uses
(hydrogen-absorbing; apparatus and method for filling hydrogen gas into hydrogen-absorbing alloy-type hydrogen-storage tank)
- IT Tanks (containers)
(hydrogen-storage; apparatus and method for filling hydrogen gas into hydrogen-absorbing alloy-type hydrogen-storage tank)
- IT 1333-74-0, Hydrogen, processes
(filling of; apparatus and method for filling hydrogen gas into hydrogen-absorbing alloy-type hydrogen-storage tank)
- IT 12018-27-8 12196-72-4 37214-75-8 63749-14-4
(hydrogen-absorbing alloy; apparatus and method for filling hydrogen gas into hydrogen-absorbing alloy-type hydrogen-storage tank)

L96 ANSWER 21 OF 66 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 2002:157066 HCAPLUS

DOCUMENT NUMBER: 136:203077

TITLE: Water management system for an electrochemical engine

INVENTOR(S): Salvador, John P.; Borup, Rodney Lynn; Pettit, William Henry

PATENT ASSIGNEE(S): General Motors Corp., USA

SOURCE: Ger. Offen., 8 pp.

CODEN: GWXXBX

DOCUMENT TYPE: Patent

LANGUAGE: German

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
DE 10130036	A1	20020228	DE 2001-10130036	20010621
US 6432568	B1	20020813	US 2000-632184	20000803
CA 2349965	A1	20020203	CA 2001-2349965	20010531
JP 2002158024	A	20020531	JP 2001-236713	20010803
PRIORITY APPLN. INFO.:			US 2000-632184	A 20000803

ED Entered STN: 01 Mar 2002

AB This electrochem. engine for a vehicle has a fuel processor which processes liquid fuel in a hydrogen gas reformer, a burner to produce heat for the fuel processor, and a fuel cell assembly which produces electricity and water vapor by using the hydrogen gas. The H2O management system of the engine has a condenser to recover liquid H2O from the H2O vapor

and a H2O **storage tank**. A H2O pump circulates H2O from the H2O **tank** to the fuel processor. In the water **tank** an outlet valve **channels** water to a special freezer **tank** to avoid freezing of the H2O in the H2O **tank**, which can lead to damage of the water pump. The water **tank** may be heated or insulated against heat loss and various arrangements are described to avoid freezing of the water in the freezer **tank**.

IC ICM B60L011-18
ICS H01M008-04
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 61
ST automobile engine **fuel cell** water management
freezer **tank**
IT Electric vehicles
Tanks (containers)
(water management system for electrochem. engine)

L96 ANSWER 22 OF 66 HCAPLUS COPYRIGHT 2007 ACS on STN
ACCESSION NUMBER: 2004:163662 HCAPLUS
DOCUMENT NUMBER: 141:9582
TITLE: Thermal effects in filling a **hydrogen storage** reservoir by adsorption under pressure Modeling and experimentation
AUTHOR(S): Delahaye, A.; Pentchev, I.; Aoufi, A.; Lamine, A. S.
CORPORATE SOURCE: Laboratoire d'Ingenierie des Materiaux et Hautes Pressions, CNRS UPR 1311 - Universite Paris 13, Villetaneuse, 93430, Fr.
SOURCE: Recents Progres en Genie des Procedes (2001), 15(80, Genie de la Reaction Chimique et des Reacteurs), 337-344
CODEN: RPGPEX; ISSN: 1166-7478
PUBLISHER: Tec & Doc - Lavoisier
DOCUMENT TYPE: Journal
LANGUAGE: French
ED Entered STN: 01 Mar 2004
AB Tech. feasible **hydrogen storage** by adsorption in a reservoir of a **fuel cell** operated vehicle requires sufficient **stored gas** quantity, a safe and economic reservoir, and a sufficiently rapid filling phase. To maximize the **storage** capacity over a relatively short time, reservoir heating must be minimized and a method developed for removal and discharge of reservoir heat. Numerical simulations are presented of a **cylindrical** reservoir based on a two-dimensional heat balance, and compared with exptl. results using granular activated carbon.
IT 1333-74-0, **Hydrogen**, uses
(thermal effects in **hydrogen storage** reservoir filling by adsorption under pressure)
CC 52-3 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 49
ST **hydrogen storage** reservoir filling adsorption
thermal effect pressure
IT Adsorbents
Adsorption
Electric vehicles
Fuel cells
Heat transfer
Simulation and Modeling

Storage**Tanks** (containers)

(thermal effects in **hydrogen storage** reservoir
filling by adsorption under pressure)

- IT 7440-44-0, Carbon, uses
(activated; thermal effects in **hydrogen storage**
reservoir filling by adsorption under pressure)
- IT 12597-68-1, Stainless steel, uses
(thermal effects in **hydrogen storage** reservoir
filling by adsorption under pressure)
- IT 1333-74-0, **Hydrogen**, uses
(thermal effects in **hydrogen storage** reservoir
filling by adsorption under pressure)

REFERENCE COUNT: 19 THERE ARE 19 CITED REFERENCES AVAILABLE FOR
THIS RECORD. ALL CITATIONS AVAILABLE IN THE
RE FORMAT

L96 ANSWER 23 OF 66 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 2001:682018 HCAPLUS

DOCUMENT NUMBER: 136:40119

TITLE: Compressed **hydrogen storage**
for **fuel-cell** vehicles

AUTHOR(S): Gardiner, Monterey R.; Cunningham, J.; Moore, R.
M.

CORPORATE SOURCE: Univ. of California, Davis, CA, USA

SOURCE: Society of Automotive Engineers, [Special
Publication] SP (2001), SP-1635 (Fuel Cells and
Alternative Fuels/Energy Systems), 65-69
CODEN: SAESA2; ISSN: 0099-5908

PUBLISHER: Society of Automotive Engineers

DOCUMENT TYPE: Journal

LANGUAGE: English

ED Entered STN: 19 Sep 2001

AB Near-term (.apprx.2005) **fuel-cell** vehicles (FCVs)
will primarily use direct-H **fuel-cell** (DHFC)
systems. The primary goal of this study was to provide an anal. basis
for including a realistic compressed H **gas** (CHG) fuel-supply
simulation within an existing dynamic DHFC system and vehicle model.
The purpose of this paper was to provide a tutorial describing the
process of modeling a H-storage system for a
fuel-cell vehicle. Three topics were studied to
address the delivery characteristics of H₂: temperature change
(ΔT), nonideal **gas** characteristics at high pressures,
and the maximum amount of H available due to the CHG **storage**
tank effective state-of-charge (SOC), i.e. how much does the
pressure drop between the **tank** and the **fuel-**
cell stack reduce the usable H₂ in the **tank**
. The Joule-Thomson coefficient provides an answer to the expected
 ΔT during expansion of the H₂ from 5000 to 45 psi. The
temperature change, however, was found to be negligible with regard to
fuel-cell thermal control issues. The departure
from the ideal **gas** law was evaluated using the Redlich-Kwong
equation of state. This provides the most accurate description of the
PV = nRT relation for simple equations of state. The pressure drop
must be calculated from a number of factors such as: **pipe** material,
bends within the **pipe**, length of **pipe**, and the number
of valves (pressure regulators) the **gas** must pass through.
The pressure drop and initial **tank** volume were used to calculate
the remaining H, and hence the effective SOC for the CHG
storage tank. Primary results for the CHG fuel

systems considered include: the temperature shows a change of .apprx.13 K, the initial volume was calculated to be 264 L (69.7 gal) for 6 kg of H2 stored at ambient temperature and 5000 psi, and the usable H2 depends on the pressure drop within the specific fuel system design. The system was used within an existing dynamic FCV model for fuel-cell vehicle analyses.

IT 1333-74-0, Hydrogen, uses
(compressed hydrogen storage for fuel
-cell vehicles)

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST compressed hydrogen storage fuel
cell vehicle

IT Vehicles
(compressed hydrogen storage for fuel
-cell)

IT Fuel cells
(compressed hydrogen storage for fuel
-cell vehicles)

IT 1333-74-0, Hydrogen, uses
(compressed hydrogen storage for fuel
-cell vehicles)

REFERENCE COUNT: 10 THERE ARE 10 CITED REFERENCES AVAILABLE FOR
THIS RECORD. ALL CITATIONS AVAILABLE IN THE
RE FORMAT

L96 ANSWER 24 OF 66 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 1999:753461 HCAPLUS

DOCUMENT NUMBER: 131:353685

TITLE: Multi-element fuel cell system

INVENTOR(S): Lakeman, John Barry; Snee, Ranulf; Green, Kevin
John; Cruickshank, John Malcolm

PATENT ASSIGNEE(S): The Secretary of State for Defence, UK

SOURCE: PCT Int. Appl., 28 pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 9960642	A1	19991125	WO 1999-GB1391	19990505
W: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW				
RW: GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG				
CA 2332591	A1	19991125	CA 1999-2332591	19990505
CA 2332591	C	20070102		
AU 9937224	A	19991206	AU 1999-37224	19990505
GB 2352557	A	20010131	GB 2000-26151	19990505
GB 2352557	B	20011128		
EP 1078409	A1	20010228	EP 1999-919435	19990505
EP 1078409	B1	20020109		
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, FI				
AT 211859	T	20020115	AT 1999-919435	19990505

ES 2167115	T3	20020501	ES 1999-919435	19990505
JP 2002516466	T	20020604	JP 2000-550162	19990505
PT 1078409	T	20020731	PT 1999-919435	19990505
US 6506511	B1	20030114	US 2000-674074	20001026
PRIORITY APPLN. INFO.:			GB 1998-10440	A 19980516
			GB 1999-718	A 19990114
			WO 1999-GB1391	W 19990505

ED Entered STN: 26 Nov 1999

AB A multi-element **fuel cell** system comprises a substantially **cylindrical** former, a rechargeable **hydrogen** fuel source and a plurality of **fuel cell** elements. The former comprises a series of interconnecting modules each perforated to allow passage of fuel to the **fuel cell** elements. Each **fuel cell** element is positioned radially outwardly of the former and is provided with **channels**, arranged to receive and direct fuel **gas**, an anode current **collector**, a **gasket**, a first diffusion backing layer, a membrane electrode assembly, a second diffusion backing layer and a cathode current **collector**. The cathode current **collector** applies even compression to the **fuel cell** element, such that good elec. contact is maintained within each **fuel cell** element. The **fuel cell** elements are elec. connected in series via resp. anode and cathode current **collectors** and then capped at each end of the former for connection to equipment. The former and current **collectors** have substantially the same coefficient of thermal expansion and the fuel source is coupled to the **fuel cell** elements. The system is suitable for man-portable applications.

IT 1333-74-0P, **Hydrogen**, uses

(multi-element **fuel cell** system)

IC ICM H01M008-02

ICS H01M008-10

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST **fuel cell** system multi element

IT Catalysts

(electrocatalysts; multi-element **fuel cell** system)

IT Polyimides, uses

(foam; multi-element **fuel cell** system)

IT **Fuel cells**

(multi-element **fuel cell** system)

IT Hydrides

(multi-element **fuel cell** system)

IT Carbon fibers, uses

(nano-; multi-element **fuel cell** system)

IT Sulfonic acids, uses

(perfluorinated, membrane; multi-element **fuel cell** system)

IT 9003-53-6, Polystyrene

(expanded; multi-element **fuel cell** system)

IT 7440-06-4, Platinum, uses

(multi-element **fuel cell** system)

IT 12597-68-1, Stainless steel, uses 37189-45-0, Tufnol

(multi-element **fuel cell** system)

IT 1333-74-0P, **Hydrogen**, uses

(multi-element **fuel cell** system)

IT 7440-44-0, Carbon, uses
(nanofibers, **hydrogen store**; multi-element
fuel cell system)
IT 9004-34-6, Cellulose, uses
(perforated, **wrapping**; multi-element **fuel**
cell system)

REFERENCE COUNT: 3 THERE ARE 3 CITED REFERENCES AVAILABLE FOR
THIS RECORD. ALL CITATIONS AVAILABLE IN THE
RE FORMAT

L96 ANSWER 25 OF 66 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 1994:666416 HCAPLUS

DOCUMENT NUMBER: 121:266416

TITLE: Electrolysis system using **fuel**
cells

INVENTOR(S): Kawamura, Toshitaka

PATENT ASSIGNEE(S): Nippon Light Metal Co, Japan; Nikkei Giken Kk

SOURCE: Jpn. Kokai Tokkyo Koho, 5 pp.

CODEN: JKXXAF

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 06163060	A	19940610	JP 1992-338147	19921125
PRIORITY APPLN. INFO.:			JP 1992-338147	19921125

ED Entered STN: 26 Nov 1994

AB The system comprises (1) a **fuel cell** using
H2-containing **gas** as a fuel, (2) an electrolytic cell
using the power obtained from the **fuel cell**, (3) a
condenser for separating the pure water discharged from the **fuel**
cell into steam and warm water, (4) a **storage**
tank for **storing** the warm water for washing solution,
bath preparation, and **sealing**, and (5) a **pipe** for
circulating the steam separated as a heat source and/or pure water source.
The electrolytic cell is an electroplating **tank**, anodization
tank, electrochem. etching **tank**, electrochem.
polishing **tank**, electrochem. coloring **tank**, and
electrochem. color-developing **tank**. Energy, steam, and warm
water are efficiently used.

IT 1333-74-0, **Hydrogen**, uses
(electrolysis system using **fuel cells** with
gas containing)

IC ICM H01M008-00

ICS C25D017-00; C25D019-00; C25D021-02; C25F007-00

CC 72-2 (Electrochemistry)

Section cross-reference(s): 52

ST electrolysis system **fuel cell**; electroplating
anodization electroetching electrocoloring electropolishing
tank

IT Anodization

Electrodeposition and Electroplating

(electrolysis system using **fuel cells** for)

IT Electrolytic cells

Fuel cells

(electrolysis system using **fuel cells** for
anodization of aluminum)

IT Coloring
Etching
Polishing
(electrochem., electrolysis system using **fuel cells** for)

IT 7429-90-5, Aluminum, reactions
(electrolysis system using **fuel cells** for anodization of)

IT 1333-74-0, **Hydrogen**, uses
(electrolysis system using **fuel cells** with **gas** containing)

IT 7732-18-5P, Water, preparation
(warm and **gaseous**; formation from electrolysis system using **fuel cells** for anodization of aluminum)

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L96 ANSWER 26 OF 66 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
ACCESSION NUMBER: 2005-345665 [35] WPIX
CROSS REFERENCE: 2004-641426
DOC. NO. NON-CPI: N2005-282504 [35]
TITLE: **Hydrogen gas** fueling station for hydrogen powered vehicle, has **storage** vessels fueling **hydrogen gas** by cascading pressures, and override for interlocked valve control system opens each actuating valve in sequential order

DERWENT CLASS: Q39; Q31; X22; X25
INVENTOR: COHEN J P; COLWELL R L; EICHELBERGER D P; FARESE D J
PATENT ASSIGNEE: (COHE-I) COHEN J P; (COLW-I) COLWELL R L; (EICH-I) EICHELBERGER D P; (FARE-I) FARESE D J; (AIRP-C) AIR PROD & CHEM INC
COUNTRY COUNT: 1

PATENT INFORMATION:

PATENT NO	KIND	DATE	WEEK	LA	PG	MAIN IPC
US 20050103400	A1	20050519	(200535)*	EN	28[8]	
US 7178565	B2	20070220	(200716)	EN		

APPLICATION DETAILS:

PATENT NO	KIND	APPLICATION	DATE
US 20050103400	A1 Div Ex	US 2003-371602	20030221
US 20050103400	A1	US 2004-925291	20040824

FILING DETAILS:

PATENT NO	KIND	PATENT NO
US 20050103400	A1 Div ex	US 6786245 B

PRIORITY APPLN. INFO: US 2004-925291 20040824
US 2003-371602 20030221

INT. PATENT CLASSIF.:

IPC ORIGINAL: B65B0031-00 [I,A]; B65B0031-00 [I,C]
IPC RECLASSIF.: F17C0001-00 [I,A]; F17C0001-00 [I,C]

BASIC ABSTRACT:

US 20050103400 A1 UPAB: 20051222

NOVELTY - The station has **storage** vessels (1) fueling a **hydrogen gas** by cascading pressures and supported by a support system (2). An override for an interlocked valve control system is provided and is accessed by use of a special code sequence on a keypad interface of a programmable logic controller (7). The override opens actuating valves (4) of each vessel in sequential order starting with the lowest pressure **storage** vessel.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is also included for a method of delivering a pressurized fluid from a self-powered station to a receiving **tank** without using mechanical compression.

USE - Used for delivering a pressurized fluid e.g. **hydrogen gas**, to a receiving **tank** e.g. fuel **tank**, of a hydrogen powered vehicle, fuel test vehicle and demonstrated vehicle that is utilized at public events.

ADVANTAGE - The station is self-powered and its delivery of fuel to the vehicle does not need any additional compression, thus eliminating the need for any hook-up to external electric power or other external utilities. The override opens each of the actuating valves of each **storage** vessel in sequential order starting with the lowest pressure **storage** vessel to minimize equalization pressure losses, thus reducing the time and power required to recharge the station. The **storage** vessels fuels the **hydrogen gas** by cascading pressures, so the highest possible differential pressures are developed, thus increasing **gas** flow rates during vehicle **tank** filling and minimizing the time required for vehicle **tank** filling. The station allows for the fueling of the hydrogen-powered vehicles in areas where there is no hydrogen infrastructure e.g. **pipeline**, plant and filling station. The station can be deployed anywhere, and provides fuel to vehicle demonstration projects on an efficient, economical basis and small hydrogen-powered vehicle fleets without the use of external electric power or other external utilities. The station safely **store** and **dispense hydrogen gas** at different pressures, thereby allowing fueling the vehicle rated for 5,000 psig or more without the use of a compressor. The station provides emergency roadside assistance to the hydrogen-powered vehicles and/or to stationary **fuel cells** or hydrogen-powered facilities at remote locations.

DESCRIPTION OF DRAWINGS - The drawing shows an elevational view of a self-contained mobile fueling station.

Storage vessels (1)
Support system (2)
Actuating valves (4)
Programmable logic controller (7)
Mobile platform (14)

MANUAL CODE: EPI: X22-A20E; X25-F03B2

L96 ANSWER 27 OF 66 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
ACCESSION NUMBER: 2004-661903 [64] WPIX
DOC. NO. CPI: C2004-236343 [64]
DOC. NO. NON-CPI: N2004-524075 [64]
TITLE: Electrical current generation system comprises rotary adsorption module fluidly connected to anode exhaust outlet and anode inlet of **fuel cell**
DERWENT CLASS: E36; H06; J01; L03; X16

INVENTOR: BABICKI M L; KEEFER B G; BABICKI M; KEEFER B
 PATENT ASSIGNEE: (QUES-N) QUESTAIR TECHNOLOGIES INC
 COUNTRY COUNT: 107

PATENT INFORMATION:

PATENT NO	KIND	DATE	WEEK	LA	PG	MAIN IPC
WO 2004076017	A2	20040910	(200464)*	EN	60	[19]
US 20040197612	A1	20041007	(200466)	EN		
EP 1652255	A2	20060503	(200629)	EN		

APPLICATION DETAILS:

PATENT NO	KIND	APPLICATION	DATE
WO 2004076017	A2	WO 2004-CA289	20040226
US 20040197612	A1 Provisional	US 2003-451057P	20030226
US 20040197612	A1	US 2004-789194	20040226
EP 1652255	A2	EP 2004-714702	20040226
EP 1652255	A2	WO 2004-CA289	20040226

FILING DETAILS:

PATENT NO	KIND	PATENT NO
EP 1652255	A2 Based on	WO 2004076017 A

PRIORITY APPLN. INFO: US 2003-451057P 20030226
 US 2004-789194 20040226

INT. PATENT CLASSIF.:

IPC ORIGINAL: B01D0053-04 [I,A]; H01M0008-04 [I,A]; H01M0008-12 [I,A]

IPC RECLASSIF.:

H01M0002-00 [I,A]; H01M0002-00 [I,C]; H01M0002-02 [I,A]; H01M0002-02 [I,C]; H01M0002-14 [I,A]; H01M0002-14 [I,C]; H01M0008-00 [I,A]; H01M0008-00 [I,C]; H01M0008-04 [I,A]; H01M0008-04 [I,C]; H01M0008-10 [I,A]; H01M0008-10 [I,C]; H01M0008-12 [I,A]; H01M0008-12 [N,A]; H01M0008-12 [I,C]; H01M0008-12 [N,C]; H01M0008-14 [N,A]; H01M0008-14 [N,C]; H01M0008-18 [I,A]; H01M0008-18 [I,C]

BASIC ABSTRACT:

WO 2004076017 A2 UPAB: 20051110

NOVELTY - An electrical current generation system comprises a rotary adsorption module fluidly connected to an anode exhaust outlet and an anode inlet of fuel cell and operable to receive exhaust gas from outlet, separate and enrich usable fuel gas from the exhaust gas by displacement purge adsorptive mechanism, and deliver portion of the enriched usable fuel gas for export from the generation system as fuel for external use in a downstream system.

DETAILED DESCRIPTION - An electrical current generation system comprises a high temperature fuel cell having an anode inlet and an anode exhaust outlet; and a rotary adsorption module fluidly connected to the anode exhaust outlet and the anode inlet and operable to receive exhaust gas from the anode exhaust outlet, to separate and enrich usable fuel gas from the exhaust gas by displacement purge adsorptive mechanism,

and to deliver at least a portion of the enriched usable fuel **gas** for export from the generation system as fuel for external use in a downstream system.

An INDEPENDENT CLAIM is also included for a process for generating electrical current comprising:

(i) providing a high temperature **fuel cell** having an anode inlet and an anode exhaust outlet and a rotary adsorption module;

(ii) providing anode exhaust **gas** from the anode exhaust outlet as a feed **gas** mixture to the rotary adsorption module;

(iii) separating and enriching usable fuel **gas** from the anode exhaust **gas** by adsorptive mechanism in the rotary adsorption module; and

(iv) providing at least a portion of the enriched usable fuel **gas** for export from the generation system for use as fuel for external use in a downstream system.

USE - For generating electrical current (claimed).

ADVANTAGE - The assembly enables selective generation of electrical power, hydrogen fuel and/or usable heat, allowing flexible operation of the generation system.

DESCRIPTION OF DRAWINGS - The figure shows an axial section of a rotary adsorption module.

Adsorbers (3)

Adsorber housing body (4)

End (6)

Axis (7)

Functional bodies (8, 9)

First valve face (10)

Second valve face (11)

Planes (12'-17')

First zone (26)

Second zone (28)

Port (30)

First stator valve face (100)

Second stator valve face (101)

Circumferential seals (106, 107)

Angular sectors (111, 112, 121, 122)

Conduit (131-133)

MANUAL CODE:

CPI: E11-N; E31-A02; E31-A03; E31-D01; E31-D02;
E31-N05B; E31-N05C; H06-A03; J01-E02B; J01-E03C;
L03-E04; L03-E04F
EPI: X16-C09

TECH

ELECTRICAL POWER AND ENERGY - Preferred Components: A second **gas** separation system is fluidly connected to the rotary adsorption module operable to further purify the usable fuel **gas** component in the exported portion of the enriched fuel **gas**, for external use in a downstream system. The high temperature **fuel cell** is a solid oxide **fuel cell** or a molten carbonate **fuel cell**. The rotary adsorption module is additionally operable to deliver at least a portion of the enriched usable fuel **gas** to the anode inlet. The second **gas** separation system is a pressure swing adsorption system. Downstream system comprises a high pressure hydrogen **storage** system operable to **store** purified hydrogen fuel for dispensing to hydrogen vehicles.

L96 ANSWER 28 OF 66 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
ACCESSION NUMBER: 2005-160683 [17] WPIX

CROSS REFERENCE: 2006-577401
 DOC. NO. CPI: C2005-113261 [38]
 DOC. NO. NON-CPI: N2005-297424 [38]
 TITLE: Electrochemical cell for generating electric current
 comprises electrochemical hydrogen generator having
 first cathode and first anode and hydrogen
fuel cell having second anode and
 second cathode
 DERWENT CLASS: A14; A17; A85; L03; X16
 INVENTOR: BRANDT K; DAVIS S M; DAVIS S
 PATENT ASSIGNEE: (BRAN-I) BRANDT K; (DAVI-I) DAVIS S M; (GILL-C)
 GILLETTE CO
 COUNTRY COUNT: 107

PATENT INFORMATION:

PATENT NO	KIND	DATE	WEEK	LA	PG	MAIN IPC
US 20040229090	A1	20041118	(200517)*	EN	13[3]	H01M008-04
WO 2004105171	A2	20041202	(200517)	EN		
EP 1629561	A2	20060301	(200617)	EN		
BR 2004010321	A	20060523	(200637)	PT		
US 7169497	B2	20070130	(200710)	EN		
CN 1853005	A	20061025	(200715)	ZH		
JP 2007503705	W	20070222	(200717)	JA	23	

APPLICATION DETAILS:

PATENT NO	KIND	APPLICATION	DATE
US 20040229090	A1	US 2003-438318	20030515
BR 2004010321	A	BR 2004-10321	20040511
CN 1853005	A	CN 2004-80016672	20040511
EP 1629561	A2	EP 2004-751864	20040511
WO 2004105171	A2	WO 2004-US14674	20040511
EP 1629561	A2	WO 2004-US14674	20040511
BR 2004010321	A	WO 2004-US14674	20040511
JP 2007503705	W	WO 2004-US14674	20040511
JP 2007503705	W	JP 2006-532945	20040511

FILING DETAILS:

PATENT NO	KIND	PATENT NO
EP 1629561	A2	Based on WO 2004105171 A
BR 2004010321	A	Based on WO 2004105171 A
JP 2007503705	W	Based on WO 2004105171 A

PRIORITY APPLN. INFO: US 2003-438318 20030515

INT. PATENT CLASSIF.:

MAIN: H01M008-04; H01M008-06
 SECONDARY: H01M002-00; H01M002-02;
 H01M008-12; H01M008-00; H01M008-10;
 H01M008-18

IPC ORIGINAL: C25B0001-00 [I,C]; C25B0001-00 [I,C]; C25B0001-02
 [I,A]; C25B0001-02 [I,A]; H01M0008-00 [I,A];
 H01M0008-00 [I,C]; H01M0008-04 [I,A]; H01M0008-04
 [I,C]; H01M0008-06 [I,A]; H01M0008-06 [I,C];
 H01M0008-10 [I,A]; H01M0008-10 [I,C]; H01M0012-00
 [I,C]; H01M0012-04 [I,A]; H01M0008-06 [I,C]

IPC RECLASSIF.: C25B0001-00 [I,C]; C25B0001-02 [I,A]; C25B0009-00 [I,A]; C25B0009-00 [I,C]; H01M0016-00 [I,A]; H01M0016-00 [I,C]; H01M0008-04 [N,A]; H01M0008-04 [N,C]; H01M0008-06 [I,A]; H01M0008-06 [I,C]; **H01M0008-18 [I,A]; H01M0008-18 [I,C]**

BASIC ABSTRACT:

US 20040229090 A1 UPAB: 20060121

NOVELTY - An electrochemical cell comprises electrochemical hydrogen generator (10) having first cathode (16) that generates **hydrogen gas** and first anode (22) adjacent to the first cathode; and hydrogen **fuel cell** having second anode that oxidizes **hydrogen gas** and second cathode adjacent to the second anode. The first anode is electrically connected to the second cathode. The first cathode is electrically connected to the second anode.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is also included for a method of generating an electrical current comprising forming an electrical connection between first anode of an electrochemical hydrogen generator and second cathode of a hydrogen **fuel cell**, and forming an electrical connection between first cathode of the electrochemical hydrogen generator and second anode of the hydrogen **fuel cell**.

USE - For generating an electric current (claimed).

ADVANTAGE - The invention prevents direct reaction of the active material of the anode and active material of the cathode.

DESCRIPTION OF DRAWINGS - The figure is a partial view of hydrogen-generating cells.

Electrochemical hydrogen generator (10)

First **housing** (12)

First cathode (16)

Electrical insulative separator layer (18)

First anode (22)

Electronic conductor (28, 30)

Gas outlet (34)

MANUAL CODE: CPI: A04-E08; A04-G02E4; A10-E09B; A12-E09; A12-E14;
L03-E04
EPI: X16-C17A; X16-D

TECH

ELECTRICAL POWER AND ENERGY - Preferred Component: The hydrogen generator further includes **gas** outlet (34), first **housing** (12) releasably engageable with the second **housing**, hydrogen-generating anode, **housing** having hydrogen outlet, anode in the **housing** having oxidizable material, cathode in the **housing** having hydrogen generator catalyst, and ionically conductive and electrical insulative separator layer (18) between anode and cathode. The hydrogen **fuel cell** includes a **gas** inlet in fluid communication with the **gas** outlet, second **housing**, and acidic polymer membrane electrolyte. The hydrogen generator is disposed in a single **housing**. The hydrogen-generating anode comprises a hydrogen **storage** composition. The electrochemical cell further includes controller, sensor, and coupling between the hydrogen generator and hydrogen **fuel cell**. The sensor is connected to the controller. The coupling fluidly connects the first cathode to the second anode. The electrochemical hydrogen generator further includes aqueous ionic electrolyte in the **housing**, and alkaline electrolyte disposed in the **housing**. The cathode further includes binder containing the catalyst. The hydrogen outlet includes a hydrophobic membrane arranged to prevent leakage of

a liquid from the **housing**. The anode and cathode are connected through an electronic conductor (28, 30) having switch. Preferred Process: The generation of electrical current further includes generating a first electron from an oxidation half cell of an electrochemical hydrogen generator, transmitting the first electron to a reduction half cell of a hydrogen **fuel cell**, transmitting a second electron from an oxidation half cell of the hydrogen **fuel cell** to a reducing half cell of the hydrogen generator, generating hydrogen from the hydrogen generator and oxidizing the generated hydrogen at the **fuel cell**, and transmitting the generated hydrogen to the **fuel cell** through a **conduit** fluidly connecting the hydrogen generator and **fuel cell**.

INORGANIC CHEMISTRY - Preferred Component: The hydrogen-generating anode comprises metal from zinc, aluminum, titanium, zirconium, or tin. The hydrogen **storage** composition is a metal hydride or misch metal alloy. The oxidizable material comprises metal from group IIa, group Ib, group III, group IIb, iron, tin, manganese, titanium, and/or zirconium. The alkali electrolyte comprises aqueous sodium hydroxide or aqueous potassium hydroxide.

POLYMERS - Preferred Component: The separator comprises non-woven fibrous polymer fabric laminated to cellophane. The non-woven fibrous polymer fabric comprises polyvinyl alcohol fibers. The binder comprises a member from high-density polyethylene or polytetrafluoroethylene.

L96 ANSWER 29 OF 66 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
 ACCESSION NUMBER: 2004-727276 [71] WPIX
 CROSS REFERENCE: 2004-256552
 DOC. NO. CPI: C2004-255458 [71]
 DOC. NO. NON-CPI: N2004-575946 [71]
 TITLE: Mixed hydrogen-oxygen fuel generation system adjusts ignition flame temperature of hydrogen-oxygen fuel produced in electrolytic cell, by passing it to temperature-lowering fluid **tank**, after which it is returned to combustion site
 DERWENT CLASS: E36; H06; J03; X25
 INVENTOR: CHOU N S; LIN H; SUM C S; TE-HUNG C
 PATENT ASSIGNEE: (CHOU-I) CHOU N S; (LINH-I) LIN H; (SUMC-I) SUM C S; (TEHU-I) TE-HUNG C
 COUNTRY COUNT: 1

PATENT INFORMATION:

PATENT NO	KIND	DATE	WEEK	LA	PG	MAIN IPC
US 20040188270	A1	20040930	(200471)*	EN	14	[6]
US 6977120	B2	20051220	(200601)	EN		

APPLICATION DETAILS:

PATENT NO	KIND	APPLICATION	DATE
US 20040188270	A1 Provisional	US 2002-404917P	20020822
US 20040188270	A1 Cont of	US 2003-644784	20030821
US 20040188270	A1	US 2004-816815	20040405

FILING DETAILS:

PATENT NO	KIND	PATENT NO
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US 20040188270 A1 Cont of US 6740436 B

PRIORITY APPLN. INFO: US 2004-816815 20040405
US 2002-404917P 20020822
US 2003-644784 20030821

INT. PATENT CLASSIF.:

IPC RECLASSIF.: C25C0003-00 [I,C]; C25C0003-16 [I,A]; H01M [I,S];
H01M0002-04 [I,A]; H01M0002-04
[I,C]; H01M0002-08 [I,A];
H01M0002-08 [I,C]; H01M0008-02 [I,A];
H01M0008-02 [I,C]; H01M0008-04 [N,A]; H01M0008-04
[N,C]; H01M0008-06 [I,A]; H01M0008-06 [I,C];
H01M0008-08 [I,A]; H01M0008-08 [I,C];
H01M0008-18 [N,A]; H01M0008-18
[N,C]

BASIC ABSTRACT:

US 20040188270 A1 UPAB: 20060203

NOVELTY - A lift pump (34) pumps an electrolytic solution for generation of hydrogen-oxygen gas in an electrolytic cell (2) into the lower portion of a water cooling tank (31). The cooled solution is then returned to the electrolytic cell. The ignition flame temperature of hydrogen-oxygen fuel produced in the electrolytic cell is adjusted by passing it to a temperature-lowering fluid tank (7), after which it is returned to combustion site.

USE - For generation of mixed hydrogen-oxygen fuel.

ADVANTAGE - The novel system avoids overheating, prevents danger electrocution, and reduces power consumption.

DESCRIPTION OF DRAWINGS - The figure shows the electrolytic cell used in the above system.

electrolytic cell (2)
fluid tank (7)
water cooling tank (31)
lift pump (34)
fluid level sensor (48)

MANUAL CODE: CPI: E11-D; E11-E; E31-A02; E31-D01; H06-A; J03-B02
EPI: X25-R01A

L96 ANSWER 30 OF 66 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
ACCESSION NUMBER: 2004-256552 [24] WPIX
CROSS REFERENCE: 2004-727276
DOC. NO. CPI: C2004-100134 [24]
DOC. NO. NON-CPI: N2004-203968 [24]
TITLE: Mixed hydrogen-oxygen fuel generator system for

gas production and fuel
cell generation, comprises electrolytic
cell(s) composed of electrolytic solution and of
components comprising bipolar electrode plate(s)
connected to power source

DERWENT CLASS:

E36; L03; X16; X25

INVENTOR:

CHOI S S; CHOU N S; CHOU T; HUI L; LIN H; NAI S C;
SUM C S; TE-HUNG C

PATENT ASSIGNEE:

(CHOU-I) CHOU N S; (LINH-I) LIN H; (NATU-N) NATURAL
ENERGY RESOURCES; (NATU-N) NATURAL ENERGY RESOURCES
INC; (SUMC-I) SUM C S; (TEHU-I) TE-HUNG C

COUNTRY COUNT:

31

PATENT INFORMATION:

PATENT NO	KIND	DATE	WEEK	LA	PG	MAIN IPC
US 20040038096	A1	20040226	(200424)*	EN	14	[6]
WO 2004019430	A2	20040304	(200424)	EN		
US 6740436	B2	20040525	(200435)	EN		
AU 2003264006	A1	20040311	(200457)	EN		
AU 2003264006	A8	20051027	(200654)	EN		

APPLICATION DETAILS:

PATENT NO	KIND	APPLICATION	DATE
US 20040038096	A1	Provisional	US 2002-404917P 20020822
US 20040038096	A1		US 2003-644784 20030821
AU 2003264006	A1		AU 2003-264006 20030822
WO 2004019430	A2		WO 2003-US24798 20030822
AU 2003264006	A8		AU 2003-264006 20030822

FILING DETAILS:

PATENT NO	KIND	PATENT NO
AU 2003264006	A1	Based on
AU 2003264006	A8	Based on

PRIORITY APPLN. INFO: US 2003-644784 20030821
 US 2002-404917P 20020822

INT. PATENT CLASSIF.:

MAIN: H01M008-08
 SECONDARY: H01M002-04; H01M008-02; H01M008-04;
 H01M008-18

IPC RECLASSIF.: C25C0003-00 [I,C]; C25C0003-16 [I,A]; H01M [I,S];
 H01M0002-04 [I,A]; H01M0002-04
 [I,C]; H01M0002-08 [I,A];
 H01M0002-08 [I,C]; H01M0008-02 [I,A];
 H01M0008-02 [I,C]; H01M0008-04 [N,A]; H01M0008-04
 [N,C]; H01M0008-06 [I,A]; H01M0008-06 [I,C];
 H01M0008-08 [I,A]; H01M0008-08 [I,C];
 H01M0008-18 [N,A]; H01M0008-18
 [N,C]

BASIC ABSTRACT:

US 20040038096 A1 UPAB: 20050528
 NOVELTY - A mixed hydrogen-oxygen fuel generator system
 comprises electrolytic cell(s) (2) composed of electrolytic solution
 for production of both **hydrogen gas** and oxygen
gas and of components comprising bipolar electrode plate(s)
 connected to power source; and water **storage tank**
 composed of hydrogen and oxygen **gas collection**
 upper chamber.

DETAILED DESCRIPTION - A mixed hydrogen-oxygen fuel generator
 system comprises:

(a) electrolytic cell(s) composed of electrolytic solution for
 production of both **hydrogen gas** and oxygen
gas and of components comprising bipolar electrode plate(s)
 connected to power source;

(b) water **storage tank** composed of
 hydrogen and oxygen **gas collection** upper chamber,
 a mechanism to remove moisture from the **gas**, a mechanism to
 cool fluids contained in the **storage tank**, a
 mechanism to circulate the fluids contained in the **storage**

tank as needed, and a lower chamber filled with the electrolytic solution to a level adequate for the functioning of the system;

(c) mechanism(s) to monitor and control operational conditions;

(d) a cooling system (31) having a source of ice water; a circulation **conduit** for the electrolytic solution; a water cooling **tank** for the cooling of the electrolytic solution, circulating in the circulation **conduit**, with the ice water; a liquid coolant **conduit** for the flow of a liquid coolant through the generator system; and at least one pump for pumping the electrolytic solution through the circulation **conduit** and for pumping the liquid coolant through the liquid coolant **conduit**;

(e) a mechanism to adjust, as needed, the ignition flame temperature of the hydrogen-oxygen fuel produced in the electrolytic cell; and

(f) a mechanism to transfer the hydrogen-oxygen fuel to a combustion site.

USE - For **gas** (e.g. hydrogen and oxygen) production and **fuel cell** generation.

ADVANTAGE - The system is safer, compact, mobile, and energy efficient. It has better insulation and operation at a lower power setting. A continuous 24 hours operation can be achieved along with better **gas** production efficiency and **fuel cell** generation.

DESCRIPTION OF DRAWINGS - The figure is the system flow diagram for an electrolytic cell.

Electrolytic cell (2)

Water **storage tank** (4)

Backfire prevention devices (8)

Power controllers (9)

Cooling system (31)

Lift pump (34)

MANUAL CODE: CPI: E11-N; E31-A02; E31-D01; L03-E04F
EPI: X16-C09; X25-R01A

TECH

MECHANICAL ENGINEERING - Preferred Component: The **gas collection** upper chamber further comprises an inside to which are secured at least two layers of drip plates at angles adequate to cause rising gases to rise in a zigzag fashion.

The mechanism to monitor and control operational conditions is pressure sensors and regulators, fluid level sensors and regulators, power controllers (9), backfire prevention devices (8), flashback prevention devices, explosion prevention devices, and/or temperature sensors and regulators.

The electrolytic cell further comprises at least one metal plate with two sides where each of two sides is insulated by an insulating partition.

The mechanism to prevent the escape of the electrolytic solution, the oxygen **gas**, and the **hydrogen gas** is a ring shaped sunken trap or an annular groove.

CHEMICAL ENGINEERING - Preferred Method: The mechanism to adjust ignition flame temperature comprises passing the hydrogen-oxygen fuel through a temperature-lowering fluid prior to the transfer of the hydrogen-oxygen fuel to the combustion site.

ORGANIC CHEMISTRY - Preferred Material: The temperature-lowering fluid is from family of liquefied ethane or ethane derivatives.

INORGANIC CHEMISTRY - Preferred Component: The alkaline electrolytic solution is composed of potassium hydroxide (KOH) and water (H₂O) in a

volumetric ratio of KOH:H2O = 2:20+/-0.05.

L96 ANSWER 31 OF 66 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
 ACCESSION NUMBER: 2002-139361 [18] WPIX
 DOC. NO. NON-CPI: N2002-105089 [18]
 TITLE: Removable electrochemical cell assembly for operation
 with manifold
 DERWENT CLASS: X16
 INVENTOR: AMENDOLA S; PETILLO P J; PETILLO S C; PATILLO S C
 PATENT ASSIGNEE: (MILL-N) MILLENNIUM CELL INC
 COUNTRY COUNT: 95

PATENT INFORMATION:

PATENT NO	KIND	DATE	WEEK	LA	PG	MAIN IPC
WO 2001082391	A2	20011101	(200218) *	EN	35	[10]
AU 2001053077	A	20011107	(200219)	EN		
EP 1281206	A2	20030205	(200310)	EN		
US 6544679	B1	20030408	(200327)	EN		
KR 2002093929	A	20021216	(200329)	KO		
CN 1430799	A	20030716	(200363)	ZH		
JP 2003532261	W	20031028	(200373)	JA	40	
TW 543220	A	20030721	(200406)	ZH		
CN 1217441	C	20050831	(200647)	ZH		

APPLICATION DETAILS:

PATENT NO	KIND	APPLICATION	DATE
WO 2001082391	A2	WO 2001-US10609	20010402
US 6544679	B1	US 2000-552017	20000419
AU 2001053077	A	AU 2001-53077	20010402
CN 1430799	A	CN 2001-809804	20010402
EP 1281206	A2	EP 2001-926547	20010402
JP 2003532261	W	JP 2001-579379	20010402
EP 1281206	A2	WO 2001-US10609	20010402
JP 2003532261	W	WO 2001-US10609	20010402
TW 543220	A	TW 2001-109465	20010419
KR 2002093929	A	KR 2002-714005	20021018
CN 1217441	C	CN 2001-809804	20010402

FILING DETAILS:

PATENT NO	KIND	PATENT NO
AU 2001053077	A	WO 2001082391
EP 1281206	A2	WO 2001082391
JP 2003532261	W	WO 2001082391

PRIORITY APPLN. INFO: US 2000-552017 20000419

INT. PATENT CLASSIF.:

MAIN: H01M002-10; H01M008-24
 IPC RECLASSIF.: H01M0010-36 [I,A]; H01M0010-36 [I,C];
 H01M0008-18 [I,A]; H01M0008-18
 [I,C]; H01M0008-24 [I,A]; H01M0008-24 [I,C]

BASIC ABSTRACT:

WO 2001082391 A2 UPAB: 20050525
 NOVELTY - The cells (100) are mounted on a supporting manifold
 (102) with connections (104,106,108,110) for circulating electrolyte

fluid through the manifold and cells. Electrical terminals (112,114) are connected to the cells so that an electrical potential is created between the terminals. One way valves in the manifold open or close when a cell is engaged or disengaged from the manifold.

DETAILED DESCRIPTION - An independent claim is included for an electrochemical cell system

USE - To provide a battery architecture that facilitates the replacement of failed cells.

ADVANTAGE - Hydrogen **fuel cell** can be incorporated for removal of any **hydrogen gas** built up by the electrochemical cells.

DESCRIPTION OF DRAWINGS - Battery with cells mounted on a manifold

Cell (100)

Manifold (102)

Fluid connections (104,106,108,110)

Terminals (112,114)

MANUAL CODE: EPI: X16-C15; X16-F03A; X16-F09

L96 ANSWER 32 OF 66 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN

ACCESSION NUMBER: 1997-202725 [18] WPIX

DOC. NO. NON-CPI: N1997-167523 [18]

TITLE: Dual-**gas** **fuel tank** assembly for powering **fuel cell** driven vehicle
- has **cylindrical** pressure **tanks** of composite material for containing oxygen@ and being partially nested within **tank** assembly **housing** and also **tanks** to **store** metal hydride powder

DERWENT CLASS: Q14; Q15

INVENTOR: BEES W J; KLINGENSMITH R D; MASCOLINO J J

PATENT ASSIGNEE: (BABW-C) BABCOCK & WILCOX CO

COUNTRY COUNT: 69

PATENT INFORMATION:

PATENT NO	KIND	DATE	WEEK	LA	PG	MAIN IPC
WO 9710969	A1	19970327	(199718)*	EN	21	[10]
AU 9670723	A	19970409	(199731)	EN		
US 5673939	A	19971007	(199746)	EN	9	[10]
EP 851815	A1	19980708	(199831)	EN		
JP 10510670	W	19981013	(199851)	JA	22	
CN 1195326	A	19981007	(199908)	ZH		
BR 9610487	A	19990323	(199917)	PT		
MX 9802166	A1	19980801	(200014)	ES		

APPLICATION DETAILS:

PATENT NO	KIND	APPLICATION	DATE
WO 9710969	A1	WO 1996-US14764	19960913
US 5673939	A	US 1995-530917	19950920
AU 9670723	A	AU 1996-70723	19960913
BR 9610487	A	BR 1996-10487	19960913
CN 1195326	A	CN 1996-196698	19960913
EP 851815	A1	EP 1996-931585	19960913
EP 851815	A1	WO 1996-US14764	19960913
JP 10510670	W	WO 1996-US14764	19960913
BR 9610487	A	WO 1996-US14764	19960913

JP 10510670 W
MX 9802166 A1

JP 1997-512799 19960913
MX 1998-2166 19980319

FILING DETAILS:

PATENT NO	KIND	PATENT NO
AU 9670723 A	Based on	WO 9710969 A
EP 851815 A1	Based on	WO 9710969 A
JP 10510670 W	Based on	WO 9710969 A
BR 9610487 A	Based on	WO 9710969 A

PRIORITY APPLN. INFO: US 1995-530917 19950920
WO 1996-US14764 19960913

INT. PATENT CLASSIF.:

MAIN: B60P003-22; H01M008-04
IPC RECLASSIF.: B60K0001-04 [I,A]; B60K0001-04 [I,C]; B60K0015-00
[N,C]; B60K0015-03 [N,A]; B60K0015-03 [N,C];
B60K0015-07 [N,A]; B60K0015-10 [N,A]; B60L0011-18
[I,A]; B60L0011-18 [I,C]; H01M0008-04 [I,A];
H01M0008-04 [I,C]

BASIC ABSTRACT:

WO 1997010969 A1 UPAB: 20060113

The dual-gas fuel tank assembly comprises a fuel tank housing having a number of cylindrical pressure tanks in it for storing oxygen fuel for the fuel cell of the vehicle. Metal hydride is placed within the fuel tank housing to fill the space around the pressure tanks and to act as a hydrogen source for the fuel cell of the vehicle. It has a mounting member for mounting the tank housing to the vehicle allowing it to act as a structural member for the vehicle.

The mounting member comprises a pair of channel members extending from opposite ends of the tank, the channel members engaging respectively associated ends of a vehicle side rail.

ADVANTAGE - The tank is of a structure allowing it to be placed where it does not take up too much space and thereby allowing economically viable vehicle range to be obtained.

Member(0004)

ABEQ EP 851815 A1 UPAB 20060113

The dual-gas fuel tank assembly comprises a fuel tank housing having a number of cylindrical pressure tanks in it for storing oxygen fuel for the fuel cell of the vehicle. Metal hydride is placed within the fuel tank housing to fill the space around the pressure tanks and to act as a hydrogen source for the fuel cell of the vehicle. It has a mounting member for mounting the tank housing to the vehicle allowing it to act as a structural member for the vehicle. The mounting member comprises a pair of channel members extending from opposite ends of the tank, the channel members engaging respectively associated ends of a vehicle side rail.

ADVANTAGE - The tank is of a structure allowing it to be placed where it does not take up too much space and thereby allowing economically viable vehicle range to be obtained.

Member(0005)

ABEQ JP 10510670 W UPAB 20060113

The dual-**gas** fuel **tank** assembly comprises a fuel **tank housing** having a number of **cylindrical** pressure **tanks** in it for **storing** oxygen fuel for the **fuel cell** of the vehicle. Metal hydride is placed within the fuel **tank housing** to fill the space around the pressure **tanks** and to act as a hydrogen source for the **fuel cell** of the vehicle. It has a mounting member for mounting the **tank housing** to the vehicle allowing it to act as a structural member for the vehicle. The mounting member comprises a pair of **channel** members extending from opposite ends of the **tank**, the **channel** members engaging respectively associated ends of a vehicle side rail.

ADVANTAGE - The **tank** is of a structure allowing it to be placed where it does not take up too much space and thereby allowing economically viable vehicle range to be obtained.

L96 ANSWER 33 OF 66 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
 ACCESSION NUMBER: 1999-431554 [37] WPIX
 DOC. NO. CPI: C1999-127369 [37]
 TITLE: Upgrading of bio **gas** and land-fill **gas** to high-purity methane or hydrogen - using new hollow fibre membrane separators, compressors, and a new type of catalytic reformer
 DERWENT CLASS: E17; E36; H06
 PATENT ASSIGNEE: (UTEN-N) UT ENG & CONSULTING GES ENERGIE & UMWELT
 COUNTRY COUNT: 1

PATENT INFORMATION:

PATENT NO	KIND	DATE	WEEK	LA	PG	MAIN IPC
DE 29709266	U1	19971023	(199937)*	DE	10	[3]

APPLICATION DETAILS:

PATENT NO	KIND	APPLICATION	DATE
DE 29709266	U1	DE 1997-29709266	19970527

PRIORITY APPLN. INFO: DE 1997-29709266 19970527

INT. PATENT CLASSIF.:

IPC RECLASSIF.: B01D0053-22 [I,A]; B01D0053-22 [I,C]; C01B0003-00 [I,C]; C01B0003-38 [I,A]; C01B0003-48 [I,A]; C01B0003-50 [I,A]; C07C0007-00 [I,C]; C07C0007-144 [I,A]; C07C0009-00 [I,C]; C07C0009-04 [I,A]; C10L0003-00 [I,C]; C10L0003-10 [I,A]

BASIC ABSTRACT:

DE 29709266 U1 UPAB: 20050829

A plant for upgrading biogas and land-fill **gas** to methane and hydrogen using hollow fibre membranes and **gas storage tanks** includes components placed in series for (a) upgrading the gases using new kinds of hollow fibre membranes capable of separating methane and carbon dioxide to give a product with a content of at least 94 percent methane in a single stage, and 99 percent in two stages, (b) hydraulic compressors of a new design connected to the upgrading stage and having variable suction and discharge pressures, together with high pressure **cylinders**

for **gas storage**, (c) the application of a **dispenser** for the purified **gas** (99 percent methane), and (d) the downstream connection of a methane reformer employing a ceramic radiant burner, water injection, catalytic reforming of the **gas** to hydrogen-rich **gas**, shift stages with downstream hollow fibre membranes to upgrade the **gas** to high-purity hydrogen (second upgrading), and high pressure **storage** of the hydrogen.

USE - For the production of gases intended for application as vehicle fuel or in **fuel cells**.

MANUAL CODE: CPI: E10-J02D1; E11-Q01; E31-A02; H06-A; N06

L96 ANSWER 34 OF 66 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
 ACCESSION NUMBER: 1993-046539 [06] WPIX
 DOC. NO. NON-CPI: N1993-035653 [21]
 TITLE: Pressure compensation device for deep sea use - has **gas** generation vessel and connected **gas storage** vessel open to sea water, and **gas** feed **pipe** connected to both
 DERWENT CLASS: Q24; Q66; Q69
 INVENTOR: KOMAKI H; SHIBUE T; TAIRA S; TAIRA T
 PATENT ASSIGNEE: (ISHI-C) ISHIKAWAJIMA HARIMA HEAVY IND; (ISHI-C) ISHIKAWAJIMA HARIMA JUKOGYO KK
 COUNTRY COUNT: 4

PATENT INFORMATION:

PATENT NO	KIND	DATE	WEEK	LA	PG	MAIN IPC
DE 4203519	A1	19930204	(199306)*	DE	9[4]	
JP 05036432	A	19930212	(199311)	JA		
US 5201611	A	19930413	(199317)	EN	9[4]	
CA 2060348	A	19930131	(199331)	EN		
DE 4203519	C2	19940511	(199417)	DE	9[4]	
CA 2060348	C	19970812	(199746)	EN		
JP 3106575	B2	20001106	(200059)	JA	5	

APPLICATION DETAILS:

PATENT NO	KIND	APPLICATION	DATE
DE 4203519 A1		DE 1992-4203519	19920207
JP 05036432 A		JP 1991-211434	19910730
JP 3106575 B2		JP 1991-211434	19910730
US 5201611 A		US 1992-821061	19920116
CA 2060348 A		CA 1992-2060348	19920130
CA 2060348 C		CA 1992-2060348	19920130
DE 4203519 C2		DE 1992-4203519	19920207

FILING DETAILS:

PATENT NO	KIND	PATENT NO
JP 3106575 B2	Previous Publ	JP 05036432 A

PRIORITY APPLN. INFO: JP 1991-211434 19910730

INT. PATENT CLASSIF.:

IPC RECLASSIF.: B63B0022-00 [I,C]; B63B0022-14 [I,A]; B63B0003-00 [I,C]; B63B0003-13 [I,A]; E21B0041-00 [I,A];

E21B0041-00 [I,C]; F17B0001-00 [I,A]; F17B0001-00 [I,C]; F17C0001-00 [I,A]; F17C0001-00 [I,C]; H01M0008-04 [I,A]; H01M0008-04 [I,C]; H01M0008-06 [I,A]; H01M0008-06 [I,C]; H01M0008-24 [I,A]; H01M0008-24 [I,C]

BASIC ABSTRACT:

DE 4203519 A1 UPAB: 20050506

The device consists of a vessel (4), to generate **gas** at deep sea level, and a **gas storage** container (6). Sea water can flow freely into/out of the container through its base. A **gas feed conduit** (1) has one branched end for connection to the two containers, while the other end is connected to a different mechanism, e.g. a **fuel cell**. The top sections of both containers are also connected by a **tube** (2).

The **gas** generation vessel may contain a low-temperature fluid; alternately, it may contain a hydrogen absorption alloy; or it may contain a high pressure **gas** and pressure compensation valves.

ADVANTAGE - Can balance inner and outer pressures, does not require extra wall thickness.

Member(0003)

ABEQ US 5201611 A UPAB 20050506

The pressure equalizer for use for storing, generating and **dispensing** gas from thin walled tanks at **great depth** beneath the sea has a gas generating tank. This contains a low-temperature, liquified gas which **upon** the **application** of heat generates a high-pressure gas which is stored in a gas storage tank into and out of which sea water freely flows **through** the bottom.

A **gas** supply line is connected at one end by branches to the tops of the respective tanks and at the other end to an **output** using gas generated in the gas generating tank.

ADVANTAGE - Can be used in deep sea without excessive wall thickness.

Member(0005)

ABEQ DE 4203519 C2 UPAB 20050506

The pressure inside the vessel is obtained with a **gas** generation container (4) and a **gas storage container** (6), which is open at the bottom to the water. The tops of the containers are **interconnected** by a line (2).

Both **containers** (4,6) are connected to a gas supply line (1) which opens up in the vessel (14) the inner pressure of which must **be** balanced with the external water pressure.

USE/ADVANTAGE - Deep sea vessels. The thickness of the material of which the vessels are made does not have to be increased.

Member(0007)

ABEQ JP 3106575 B2 UPAB 20050506

The device consists of a vessel (4), to generate **gas** at deep sea level, and a **gas storage** container (6). Sea water can flow freely into/out of the container through its base. A **gas feed conduit** (1) has one branched end for connection to the two containers, while the other end is connected to a different mechanism, e.g. a **fuel cell**. The top sections of both containers are also connected by a **tube** (2).

The **gas** generation vessel may contain a low-temperature

fluid; alternately, it may contain a hydrogen absorption alloy; or it may contain a high pressure **gas** and pressure compensation valves.

ADVANTAGE - Can balance inner and outer pressures, does not require extra wall thickness.

L96 ANSWER 35 OF 66 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
 ACCESSION NUMBER: 1992-373017 [45] WPIX
 DOC. NO. NON-CPI: N1992-284430 [21]
 TITLE: Hydrogen removal system for metal-air **fuel cell** - has degassing vessel connected to recirculating loop and purging air appts. passing air through **storage tank** and degassing vessel
 DERWENT CLASS: X16
 INVENTOR: LAPP S P
 PATENT ASSIGNEE: (ALCN-C) ALCAN INT LTD; (YARN-C) YARDNEY TECH PROD INC
 COUNTRY COUNT: 18

PATENT INFORMATION:

PATENT NO	KIND	DATE	WEEK	LA	PG	MAIN IPC
US 5156925	A	19921020	(199245)*	EN	8[7]	
WO 9307652	A1	19930415	(199316)	EN	16[7]	
CA 2120775	C	20030318	(200325)	EN		

APPLICATION DETAILS:

PATENT NO	KIND	APPLICATION	DATE
US 5156925 A		US 1991-773511	19911009
CA 2120775 C		CA 1992-2120775	19920929
WO 9307652 A1		WO 1992-CA429	19920929
CA 2120775 C		WO 1992-CA429	19920929

FILING DETAILS:

PATENT NO	KIND	PATENT NO
CA 2120775 C	Based on	WO 9307652 A

PRIORITY APPLN. INFO: US 1991-773511 19911009

INT. PATENT CLASSIF.:

IPC RECLASSIF.: H01M0010-42 [I,C]; H01M0010-52 [I,A]; H01M0012-00 [I,C]; H01M0012-06 [I,A]; **H01M0002-00** [I,C]; **H01M0002-40** [I,A]

BASIC ABSTRACT:

US 5156925 A UPAB: 20060107

The **fuel cell** comprises a **fuel cell** assembly **housing**, a set of metal/air cells disposed in the **housing**, an electrolyte **storage tank**, a recirculation loop for continuously recirculating electrolyte from the **storage tank** through the metal/air cells, air injection means for flowing air between the metal/air cells and a degassing vessel connected to the recirculating loop to discharge **hydrogen gas** through a top opening and discharge electrolyte through a bottom outlet for return to the **storage tank**.

A purging air system passes air through the electrolyte **storage tank** and then through the degassing vessel.

A **gas** discharge **conduit** draws off purge air and hydrogen discharging from the degassing vessel and a filter is connected to the discharge **conduit** for removing caustic vapour or mist from the discharging purge air and hydrogen.

ADVANTAGE - Hydrogen is removed from cell stack and electrolyte **storage tank** without emitting caustic vapour or mist.

MANUAL CODE: EPI: X16-C03

Member(0002)

ABEQ WO 1993007652 A1 UPAB 20060107

The **fuel cell** comprises a **fuel cell** assembly **housing**, a set of metal/air cells disposed in the **housing**, an electrolyte **storage tank**, a recirculation loop for continuously recirculating electrolyte from the **storage tank** through the metal/air cells, air injection means for flowing air between the metal/air cells and a degassing vessel connected to the recirculating loop to discharge **hydrogen gas** through a top opening and discharge electrolyte through a bottom outlet for return to the **storage tank**.

A purging air system passes air through the electrolyte **storage tank** and then through the degassing vessel.

A **gas** discharge **conduit** draws off purge air and hydrogen discharging from the degassing vessel and a filter is connected to the discharge **conduit** for removing caustic vapour or mist from the discharging purge air and hydrogen.

ADVANTAGE - Hydrogen is removed from cell stack and electrolyte **storage tank** without emitting caustic vapour or mist.

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L96 ANSWER 36 OF 66 COMPENDEX COPYRIGHT 2007 EEI on STN

ACCESSION NUMBER: 2006(42):11047 COMPENDEX

TITLE: Enhancement of heat transfer in hydrogen **storage tank** using hydrogen absorbing alloy (improvement of metal hydride **tank** design for high charging rate).

AUTHOR: Mitsutake, Yuichi (Department of Mechanical Engineering Saga University, Saga-shi, Saga, 840-8502, Japan); Monde, Masanori; Oyakawa, Kenshun; Uchida, Hiroshi; Tsunokake, Shigeru; Fuura, Tatsuya

SOURCE: Nihon Kikai Gakkai Ronbunshu, B Hen/Transactions of the Japan Society of Mechanical Engineers, Part B v 72 n 7 July 2006 2006.p 1645-1651

SOURCE: Nihon Kikai Gakkai Ronbunshu, B Hen/Transactions of the Japan Society of Mechanical Engineers, Part B v 72 n 7 July 2006 2006.p 1645-1651

CODEN: NKBDD ISSN: 0387-5016

PUBLICATION YEAR: 2006

DOCUMENT TYPE: Journal

TREATMENT CODE: Theoretical; Experimental

LANGUAGE: Japanese

AN 2006(42):11047 COMPENDEX

AB A hydrogen **storage** system using metal hydride (MH) has

several problems to be solved before practical use. Among of them a long charging time required due to the poor heat transmission in MH bed during exoergic hydride forming reaction is essential for the hydrogen **storage** system of **fuel cell** electric vehicles. Four small **tanks** (effective hydrogen capacity 1.25 Nm³) using a La-Ni based AB 5 type hydrogen **storage** alloy were made by way of trial to attain the charging time within 10 minutes absorbing 80% of effective hydrogen capacity. The experiments were carried out to evaluate effects of thermal design of the **tank**, coolant condition on hydrogen absorption rate. Calculation of the process was done to improve performance of heat transfer in MH bed with additional thermal fins and rearrangement of coolant **channels**. The final version of the **tank** satisfied the required charging time even for higher coolant temperature of 21deg C which reduces chiller load of a hydrogen station. 5 Refs.

AN 2006(42):11047 COMPENDEX

CC 641.2 Heat Transfer; 619.2 Tanks; 522 Gas Fuels; 804.2 Inorganic Compounds; 432 Highway Transportation; 702.2 Fuel Cells

CT *Heat transfer; **Gas fuel storage**; Hydrides; **Fuel cells**; Coolants; Electric vehicles; **Tanks** (containers)

ST Hydrogen Absorbing Metals; Hydrogen **Storage**; Hydrogen Absorption; Coolant **channels**

ET La*Ni; La sy 2; sy 2; Ni sy 2; La-Ni

L96 ANSWER 37 OF 66 COMPENDEX COPYRIGHT 2007 EEI on STN

ACCESSION NUMBER: 2006(41):14398 COMPENDEX

TITLE: A hydro revolution.

AUTHOR: Whitworth, Ben

SOURCE: Automotive Engineer (London) v 31 n 8 September 2006 2006.p 18-19

SOURCE: Automotive Engineer (London) v 31 n 8 September 2006 2006.p 18-19

CODEN: EUENDA ISSN: 0307-6490

PUBLICATION YEAR: 2006

DOCUMENT TYPE: Journal

TREATMENT CODE: General Review

LANGUAGE: English

AN 2006(41):14398 COMPENDEX

AB Mazda's RX-8 Hydrogen RE, first production-ready hydrogen and petrol car, is the greenest car on the planet. The company's transformation of the RX-8 from petrol to a petrol-hydrogen hybrid is a relatively straightforward one. The award-winning Renesis twin-motor engine is fitted with a second set of injectors for the hydrogen which are situated above the intake chamber. A hydrogen rotary engine is not as efficient as a **fuel cell**, but structurally it is closer to the petrol engine, so its manufacturing cost is lower and it has less durability issues. The hydrogen is **stored** in liquid form in a second fuel **tank**, a high-pressure carbon and aluminum **cylinder** which is housed in the boot. The RX-8 RE is an impressive car as the only **gas** coming out of the exhaust is water vapor and there is no CO₂ and exceptionally low levels of NO_x nitrogen oxides, so its green credentials are impeccable. The car makes the crop of green cars, such as the Toyota Prius and Honda Civic IMA look old. (Edited abstract)

AN 2006(41):14398 COMPENDEX

CC 664 Automotive Engineering, General; 913.1 Production Engineering; 804 Chemical Products Generally; 663 Buses, Tractors and Trucks; 612.1 Internal Combustion Engines (General); 911.1 Cost Accounting

CT *Automotive engineering; Production engineering; Hydrogen; Ground
vehicles; Rotary engines; Cost accounting; Pressure effects
ST Mazda (CO); Petrol cars; Motor engines; Hydrogen rotary engines
ET C*O; CO; C cp; cp; O cp

L96 ANSWER 38 OF 66 COMPENDEX COPYRIGHT 2007 EEI on STN

ACCESSION NUMBER: 2006(28):3913 COMPENDEX
TITLE: Hydrogen **storage**: A work in progress.
AUTHOR: Nikbin, Darius
SOURCE: Fuel Cell Review v 3 n 1 February/March 2006
2006.p 15-18
SOURCE: Fuel Cell Review v 3 n 1 February/March 2006
2006.p 15-18
ISSN: 1743-3029
PUBLICATION YEAR: 2006
DOCUMENT TYPE: Journal
TREATMENT CODE: Theoretical; Experimental
LANGUAGE: English

AN 2006(28):3913 COMPENDEX

AB The US Department of Energy (DOE) is developing innovative and commercially viable hydrogen-**storage** materials for on-board applications. The research communities are giving more efforts to come up with practical way of **storing** hydrogen fuel safely and economically for mass market transportation. There are three main approaches to **store** the hydrogen on board **fuel-cell** vehicles, namely compressed **gas cylinder**, liquid **storage tank**, and hydrogen-**storage** materials. The **storage** materials for hydrogen can deliver greater volumetric hydrogen density compared with liquid and **gas storage** by bonding hydrogen with other elements via physisorption, chemisorption, or the formation of complex chemical hydrides with extensive covalent bonding between constituents. Light-metal hydrides are becoming the promising candidate for on-board hydrogen-**storage** material. The **storage** of hydrogen is gateway to accelerating the hydrogen economy and will be a great leap forward on the world scene. (Edited abstract)

AN 2006(28):3913 COMPENDEX

CC 522 Gas Fuels; 431.2 Passenger Air Transportation; 801.4 Physical Chemistry; 802.2 Chemical Reactions; 804.2 Inorganic Compounds; 461.1 Biomedical Engineering

CT *Hydrogen fuels; Mass transportation; Hydrogen bonds; Chemisorption; Hydrides; Large scale systems; **Fuel cells**

ST The US Department of Energy (DOE); Physisorption; **Fuel-cell** vehicles

L96 ANSWER 39 OF 66 COMPENDEX COPYRIGHT 2007 EEI on STN

ACCESSION NUMBER: 2006(48):14452 COMPENDEX
TITLE: Substitution of high-pressure charge by electrolysis charge and hydrogen environment embrittlement susceptibilities for inconel 625 and SUS 316L.
AUTHOR: Murakami, Kota (Department of Mechanical Engineering Graduate School of Science and Technology Sophia University, Tokyo 102-8554, Japan); Yabe, Nobuaki; Suzuki, Hiroshi; Takai, Kenichi; Hagihara, Yukito; Wada, Yoru
MEETING TITLE: ASME PVP2006/ICPVT-11 Conference.
MEETING LOCATION: Vancouver, BC, Canada
MEETING DATE: 23 Jul 2006-27 Jul 2006

SOURCE: American Society of Mechanical Engineers, Pressure Vessels and Piping Division (Publication) PVP v 2006 2006. 8p

SOURCE: American Society of Mechanical Engineers, Pressure Vessels and Piping Division (Publication) PVP v 2006 2006. 8p

SOURCE: Proceedings of 2006 ASME Pressure Vessels and Piping Division Conference - ASME PVP2006/ICPVT-11 Conference - Pressure Vessel Technologies for the Global Community
CODEN: APVPDM ISSN: 0277-027X

PUBLICATION YEAR: 2006

MEETING NUMBER: 68586

DOCUMENT TYPE: Conference Article

TREATMENT CODE: Theoretical

LANGUAGE: English

AN 2006(48):14452 COMPENDEX

AB Hydrogen-fuel-cell vehicles have been developed and the gaseous pressure in the current major **storage tanks** of the vehicles varies from 35 to 70 MPa because of the demand for the increase in running distance. Hydrogen refueling stations are required to be resistant to 100 MPa **hydrogen gas** and the alloys used for such stations are required to have an excellent resistance to hydrogen environment embrittlement (HEE). The purposes of the present study are to substitute the high-pressure gaseous charge of hydrogen by electrolysis charge and to evaluate hydrogen degradation susceptibilities for Inconel 625 and SUS 316L in the environments substituted by electrolysis charge. Electrolysis hydrogen was charged to Inconel 625 and SUS 316L at various electrolysis fugacities and gaseous hydrogen was charged from 0.3 to 45 MPa **hydrogen gas** at 90 deg C. Hydrogen states and contents were compared using thermal desorption analysis (TDA). Hydrogen degradation susceptibilities were evaluated using the slow strain rate technique (SSRT) at a constant extension rate of 8.6×10^{-6} /s at room temperature. The fundamental properties of thermal hydrogen desorption for Inconel 625 and SUS 316L were first analyzed to compare the hydrogen states after hydrogen charge by electrolysis and high pressure. The peak temperatures and profiles of hydrogen desorption do not change with charging temperature. When hydrogen is charged by electrolysis and high pressure until hydrogen saturation at 90deg C, the peak temperatures and profiles are the same in both environments. This means that hydrogen diffusion during and hydrogen states after hydrogen absorption are independent of charging method in spite of the differences in adsorption and dissociation reaction on the specimen surfaces. Using Sieverts law, the fugacity of electrolysis can transform into gaseous pressure. This indicates that high-pressure hydrogen environments in **pipes** or other components at hydrogen refueling stations can be substituted by electrolysis charge. Fracture strain in Inconel 625 decreases as hydrogen content charged by electrolysis increases, whereas that in SUS 316L does not change regardless of the hydrogen content of 161.5 mass ppm. Grain boundary fracture is observed on the surface of Inconel 625 absorbing a hydrogen content of 27.5 mass ppm, which corresponds to 59.2 MPa **hydrogen gas** at R.T using Sieverts law. In contrast, the fracture surfaces of SUS 316L hydrogen-charged at extremely high fugacities remain **ductile** dimples. Thus, hydrogen degradation susceptibility is much lower for SUS 316L than for Inconel 625. Copyright \$CPY 2006 by ASME. 10 Refs.

AN 2006(48):14452 COMPENDEX

CC 701.1 Electricity: Basic Concepts and Phenomena; 931.2 Physical

Properties of Gases, Liquids and Solids; 801.4.1 Electrochemistry;
 702.2 Fuel Cells; 804 Chemical Products Generally; 531.1 Metallurgy
 CT *Electric charge; Electrolysis; High pressure effects; Hydrogen
 embrittlement; **Fuel cells**; Hydrogen
 ST Thermal desorption analysis (TDA); Hydrogen degradation
 susceptibilities; Slow strain rate technique (SSRT); Thermal hydrogen
 desorption

L96 ANSWER 40 OF 66 COMPENDEX COPYRIGHT 2007 EEI on STN

ACCESSION NUMBER: 2005(10):11417 COMPENDEX

TITLE: Pump up the **gas**.

AUTHOR: Pool, Rebecca

SOURCE: IEE Power Engineer v 19 n 1 February/March 2005
 2005.p 18-21

SOURCE: IEE Power Engineer v 19 n 1 February/March 2005
 2005.p 18-21
 ISSN: 1479-8344

PUBLICATION YEAR: 2005

DOCUMENT TYPE: Journal

TREATMENT CODE: General Review

LANGUAGE: English

AN 2005(10):11417 COMPENDEX

AB Hydrogen **storage** is crucial for the transition to a
 hydrogen-based economy. To compete with conventional
 hydrocarbon-fuelled vehicles, the hydrogen vehicle must be able to
 travel a comparable distance, around 300 miles. The US-based Quantum
 Fuel System Technologies has developed the world's first 100,000psi
tank, a composite **cylinder** with refuelling rate of
 1kg/minute, which has already been deployed in **fuel**
cell vehicles. It is observed that researchers in the
storage arena are turning their attention to high surface area
 materials, which are capable of **storing** hydrogen at higher
 volumetric densities than compressed and liquid hydrogen. (Edited
 abstract)

AN 2005(10):11417 COMPENDEX

CC 522 Gas Fuels; 804 Chemical Products Generally; 804.1 Organic
 Components; 525.7 Energy Storage; 619.2 Tanks; 662.1 Automobiles

CT *Hydrogen fuels; Hydrocarbons; Energy **storage**; Fuel
tanks; Racing automobiles; Crude petroleum; **Fuel**
cells; Magnesium compounds

ST Hydrogen-based economy; Hydrogen **storage**; Hydrogen-powered
 cars; Energy density

L96 ANSWER 41 OF 66 COMPENDEX COPYRIGHT 2007 EEI on STN

ACCESSION NUMBER: 2005(14):1726 COMPENDEX

TITLE: Prospects for CO2 capture and **storage**.

AUTHOR: Anon

SOURCE: Energy World n 327 March 2005 2005.p 14-16

SOURCE: Energy World n 327 March 2005 2005.p 14-16

CODEN: EGYWA2 ISSN: 0307-7942

PUBLICATION YEAR: 2005

DOCUMENT TYPE: Journal

TREATMENT CODE: General Review

LANGUAGE: English

AN 2005(14):1726 COMPENDEX

AB The prospects for Carbon dioxide capture and **storage** (CCS),
 as speculated by the International Energy Agency, are discussed. CCS
 is considered to be a promising emission reduction option with
 important environmental, economic, and energy supply security
 benefits. It involves capturing carbon dioxide from the **gas**

streams emitted during electricity production or industrial processes, transporting the captured carbon dioxide by **pipeline** or in **tankers** and **storing** carbon dioxide under ground in deep saline aquifers. In electricity generation, carbon dioxide capture is most effective when used in combination with large-scale, high-efficiency power plants. (Edited abstract)

AN 2005(14):1726 COMPENDEX

CC 804.2 Inorganic Components; 525.7 Energy Storage; 912.2 Management; 911.2 Industrial Economics; 701.1 Electricity: Basic Concepts and Phenomena; 511.1 Oil Field Production Operations

CT *Carbon dioxide; Electricity; **Fuel cells**; Costs; Environmental impact; Enhanced recovery; Installation; Fuels; Flue gases; Energy **storage**; Project management; Investments

ST Carbon dioxide capture and **storage** (CCS); Integrated gasification combined cycle (IGCC); Ultra supercritical steam cycles (USCSC); Enhanced coalbed methane recovery (ECBM)

ET C*O; CO; C cp; cp; O cp

L96 ANSWER 42 OF 66 COMPENDEX COPYRIGHT 2007 EEI on STN

ACCESSION NUMBER: 2006(41):12293 COMPENDEX

TITLE: Hydrogen state and degradation of type 316L and alloy 625 for high-pressure hydrogen **storage tank of fuel cell.**

AUTHOR: Takai, Kenichi (Department of Mechanical Engineering Sophia University, Chiyoda-ku, Tokyo 102-8554, Japan); Yabe, Nobuyuki; Murakami, Kota; Hagiwara, Yukito

MEETING TITLE: EUROCORR 2005: European Corrosion Congress.

MEETING ORGANIZER: International Society of Electrochemistry; ALSTOM; Fundacao Montepio Geral; galp Energia; Caixa Geral de Depositos; et al

MEETING LOCATION: Lisbon, Portugal

MEETING DATE: 04 Sep 2005-08 Sep 2005

SOURCE: EUROCORR 2005: European Corrosion Congress, Proceedings 2005. 8p

SOURCE: EUROCORR 2005: European Corrosion Congress, Proceedings 2005. 8p

SOURCE: EUROCORR 2005: European Corrosion Congress, Proceedings

PUBLICATION YEAR: 2005

MEETING NUMBER: 68147

DOCUMENT TYPE: Conference Article

TREATMENT CODE: Theoretical; Experimental

LANGUAGE: English

AN 2006(41):12293 COMPENDEX

AB High-resistance metals to hydrogen degradation have been required since hydrogen pressure in a **storage tank** for a **fuel cell** vehicle varies from 35 MPa to 70 MPa, and that in the **tank** for hydrogen refueling station increases to above 100 MPa. FCC metals used under the high-pressure hydrogen for **fuel-cell** constituent materials such as Type 316L and Alloy 625 were prepared, because of the low susceptibility to hydrogen degradation. Three principal aspects regarding the fee metals are present here: (1) to analyze hydrogen desorption properties of fee metals obtained by thermal desorption analysis (TDA), (2) to find out the condition of electrolysis hydrogen charging corresponding to various hydrogen pressures, since the charging under high-pressure hydrogen is much danger and more expensive than the electrolysis hydrogen charging, and (3) to clarify the relationship between the

hydrogen state and the degradation properties using slow strain rate technique (SSRT). The both metals were solution heat treated, charged under the electrolysis and high-pressure hydrogen, then analyzed hydrogen content and the states. The electrolysis hydrogen charging enables us to substitute high-pressure hydrogen atmosphere such as hydrogen refueling station using Sieverts rule, since hydrogen state absorbed by the electrolysis and high-pressure conform without the surface damage. The strain to failure of Alloy 625 is critically dependent on hydrogen content and decreases with increasing hydrogen content. The fracture surfaces transform from **ductile** to brittle with increasing hydrogen. In contrast, the strain to failure of Type 316L remains constant regardless of high hydrogen content. The specimen surfaces remain **ductile** fracture up to hydrogen content of 93.1 mass ppm. 7 Refs.

AN 2006(41):12293 COMPENDEX

CC 531.1 Metallurgy; 522 Gas Fuels; 804 Chemical Products Generally; 702.2 Fuel Cells; 701.2 Magnetism: Basic Concepts and Phenomena; 801.4.1 Electrochemistry

CT *Alloying elements; **Fuel cells**; Magnetic susceptibility; Phase transitions; Fractography; Electrolysis; **Gas fuel storage**; Hydrogen

ST Thermal desorption spectrometry; Hydrogen pressure; **Fuel-cell** constituent materials; Hydrogen charging

L96 ANSWER 43 OF 66 COMPENDEX COPYRIGHT 2007 EEI on STN

ACCESSION NUMBER: 2004(18):7812 COMPENDEX

TITLE: In situ neutron imaging technique for evaluation of water management systems in operating PEM **fuel cells**.

AUTHOR: Satija, R. (Natl. Inst. of Std. and Technology, Gaithersburg, MD 20899, United States); Jacobson, D.L.; Arif, M.; Werner, S.A.

SOURCE: Journal of Power Sources v 129 n 2 Apr 22 2004 2004.p 238-245

SOURCE: Journal of Power Sources v 129 n 2 Apr 22 2004 2004.p 238-245

CODEN: JPSODZ ISSN: 0378-7753

PUBLICATION YEAR: 2004

DOCUMENT TYPE: Journal

TREATMENT CODE: Theoretical

LANGUAGE: English

AN 2004(18):7812 COMPENDEX

AB This paper explores the method of neutron imaging as an experimental tool to perform in situ non-destructive analysis on an operating polymer electrolyte membrane hydrogen **fuel cell**. Neutrons are ideal for the imaging of hydrogen **fuel cells** because of their sensitivity to hydrogen-containing compounds such as water. This research focused on using imaging techniques to develop methods for testing and evaluating the water management system of a **fuel cell**. A real-time radiography dataset consisting of 1000 images at 2-s intervals was used to create a movie which showed water production, transport, and removal throughout the cell. This dataset was also analyzed to quantify and calculate the amount of water present in the cell at any time and masking techniques were used to differentiate between water in the cell flow **channels** and in the **gas** diffusion layer. Additionally, a tomography dataset allowed for the creation of a digital 3-dimensional (3-D) reconstruction of the dry cell which can be analyzed for structural defects. \$CPY 2004 Elsevier B.V. All rights reserved. 6 Refs.

AN 2004(18):7812 COMPENDEX
CC 702.2 Fuel Cells; 723.2 Data Processing; 741 Light, Optics and Optical Devices; 422.2 Test Methods; 804 Chemical Products Generally; 461.1 Biomedical Engineering
CT *Fuel cells; Data reduction; Cameras; Neutrons; Charge coupled devices; Electrolytes; Cost effectiveness; Imaging techniques; Nondestructive examination; Hydrogen; Radiography; Heat shielding; Electric energy storage
ST Water management; Polymer electrolyte membranes
ET D

L96 ANSWER 44 OF 66 COMPENDEX COPYRIGHT 2007 EEI on STN

ACCESSION NUMBER: 2005(18):11701 COMPENDEX
TITLE: Generation of hydrogen from bio-oils.
AUTHOR: Canter, Neil (Chemical Solutions, Willow Grove, PA, United States)
SOURCE: Tribology and Lubrication Technology v 60 n 11 November 2004 2004.p 14-15
SOURCE: Tribology and Lubrication Technology v 60 n 11 November 2004 2004.p 14-15
ISSN: 0024-7154
PUBLICATION YEAR: 2004
DOCUMENT TYPE: Journal
TREATMENT CODE: Experimental
LANGUAGE: English

AN 2005(18):11701 COMPENDEX

AB **Fuel cell** commercialization continues to be a major research focus, especially in the United States after President Bush committed dollar 1.7 billion for research into developing automobiles using hydrogen as a fuel and developing the infrastructure needed to service these vehicles. An article in the March 2004 issue of Tech Beat provides background on **fuel cell** development. One of the key problems remaining is the type of fuel to be used to power a **fuel cell** in an automobile. Hydrogen itself can be used and **stored** as was indicated in the earlier article in **gas cylinders** compressed to a pressure of approximately 5,000 psi. But hydrogen by nature is hazardous, can be expensive to manufacture and is difficult to **store** in large quantities in a **fuel tank**. There are other options such as using sodium borohydride, but to produce hydrogen economically a cheaper, more plentiful source is required. One approach that is theoretically attractive is to use a source of biomass or bio-oils. (Edited abstract)

AN 2005(18):11701 COMPENDEX

CC 804 Chemical Products Generally; 512.1 Petroleum Deposits; 931 Applied Physics Generally; 607.2 Lubrication
CT *Hydrogen; Tribology; Lubrication; Crude petroleum
ST Bio-oils; Lubrication technology

L96 ANSWER 45 OF 66 COMPENDEX COPYRIGHT 2007 EEI on STN

ACCESSION NUMBER: 2003(31):3762 COMPENDEX
TITLE: Characterization of multilayer anodes for SOFC.
AUTHOR: Muller, Axel C. (Institut Werkstoffe Elektrotechnik Universitat Karlsruhe (TH), D-76131 Karlsruhe, Germany); Krugel, Albert; Weber, Andre; Ivers-Tiffee, Ellen
MEETING TITLE: Solid State Ionics 2002.
MEETING LOCATION: Boston MA, United States
MEETING DATE: 02 Dec 2002-05 Dec 2002
SOURCE: Materials Research Society Symposium - Proceedings

SOURCE: v 756 2003.p 533-538
Materials Research Society Symposium - Proceedings
v 756 2003.p 533-538
CODEN: MRSPDH ISSN: 0272-9172
PUBLICATION YEAR: 2003
MEETING NUMBER: 61149
DOCUMENT TYPE: Conference Article
TREATMENT CODE: Experimental
LANGUAGE: English

AN 2003(31):3762 COMPENDEX

AB SOFC anodes have to combine various tasks. In anode supported single cells a thick anode substrate is used for current **collecting** and **gas** distribution whereas a thin functional layer adjacent to the electrolyte is the electrochemically active part of the anode. This functional anode layer is cofired together with the thin film electrolyte to obtain an enhanced interface with low polarisation losses. This multilayer structure was transferred to an electrolyte supported single cell. The electrochemical active Ni/8YSZ anode layer was **screen** printed onto a 8YSZ electrolyte green tape and subsequently cofired at 1350deg . Mechanical stresses during cofiring due to shrinkage mismatch of anode and electrolyte were avoided by changing the geometry of the anode layer from a continuous layer to a large number of small sized individual areas. Simulations by finite element modeling indicated that a hexagonal pattern similar to honey-combs is preferable. The second layer which adjoins to the fuel **gas channels** and which is responsible for current **collecting** and **gas** distribution was later on **screen** printed on top and sintered together with the cathode. Single cells with a multilayer anode and different functional layers were electrochemically characterised under realistic operation conditions. The performance and reduction/oxidation stability of this type of anode was investigated. The electrochemically active layer showed only small degradation during redox cycling and long term operation at high fuel utilisation. In contradiction to single layer anodes Nickel agglomeration was not observed in the functional layer.
8 Refs.

AN 2003(31):3762 COMPENDEX

CC 714.1 Electron Tubes; 702.2 Fuel Cells; 931.2 Physical Properties of Gases, Liquids and Solids; 921.5 Optimization Techniques; 802.2 Chemical Reactions; 548.1 Nickel

CT *Anodes; Nickel; Agglomeration; Stability; Shrinkage; Finite element method; Redox reactions; Multilayers; Solid oxide **fuel cells**; Characterization; Solid electrolytes; Stresses

ST Multilayer anodes; Thin film electrolyte; Shrinkage mismatch; Reduction oxidation stability

ET Ni

L96 ANSWER 46 OF 66 COMPENDEX COPYRIGHT 2007 EEI on STN

ACCESSION NUMBER: 1979(8):1001 COMPENDEX

DOCUMENT NUMBER: 790861878

TITLE: ROLE OF HYDROGEN IN OUR FUTURE FUEL SUPPLY.

AUTHOR: Braun Moritz J. (Brown, Boveri & Co, Baden, Switz)

SOURCE: Electron Power v 25 n 2 Feb 1979 p 110-113

SOURCE: Electron Power v 25 n 2 Feb 1979 p 110-113

CODEN: ELPWAQ ISSN: 0013-5127

PUBLICATION YEAR: 1979

LANGUAGE: English

AN 1979(8):1001 COMPENDEX DN 790861878

AB Within 40 years the world will be depending heavily on three energy sources, which are all badly suited for distribution and consumer use.

Load levelling and **storage** are uneconomical with nuclear power and especially with solar energy. With the exception of coal they are, however, clean and environmentally acceptable for large-scale use. The solution to this problem is to use a secondary energy-carrier system, which has to be able to connect economically scattered consumer locations to their supply centres. It will also have to provide a means of **storage** to smooth out demand and supply and also be compatible with the end-user requirements. Hydrogen is compatible with future energy sources, with other secondary energy carriers as well as with most end user requirements. This means it can easily be produced from water, the original energy being derived from either fossil fuels, e.g. nuclear, solar, geothermal, wind etc. Hydrogen energy can be transformed into electricity by **fuel cells** or generators coupled to **gas** turbines as well as regenerated from electricity by water electrolysis. It can be burned to yield hot water for district heating. End users can get electrical, mechanical, chemical or thermal energy from hydrogen by using **fuel cells**, internal-combustion engines, turbines, chemical reactors or burners. Hydrogen can be **stored** as a **gas** (bottled or underground), a liquid (cryogenic **tanks**) or in a solid form (metal hydrides). It can be distributed by the conventional and partly existing infrastructure of today's natural **gas** transportation and distribution **pipe** system with only minor modifications. The introduction of hydrogen as a main energy carrier is more an economic than a technical problem. Being a secondary energy carrier hydrogen will always be more expensive than the primary energy sources from which it has to be produced. It will play a major role only after the oil and **gas** era, which means after the year 2000. The earliest breakthroughs will occur in countries with no or few fossil energy resources and which have to turn to nuclear and solar energy first. After the year 2020, hydrogen will become a major energy carrier in many parts of the world.

AN 1979(8):1001 COMPENDEX DN 790861878
 CC 521 Combustion & Fuels; 522 Gas Fuels; 523 Liquid Fuels; 694 Packaging & Storing
 CT *HYDROGEN FUELS; FUELS:**Storage**

L96 ANSWER 47 OF 66 COMPENDEX COPYRIGHT 2007 EEI on STN

ACCESSION NUMBER: 1980(12):1132 COMPENDEX

DOCUMENT NUMBER: 801290999

TITLE: DOE PROGRAM ON HYDROGEN ENERGY SYSTEMS: WHAT'S HAPPENING?.

AUTHOR: Berger, Beverly J. (US DOE, Washington, DC); Swisher, James H.

SOURCE: Energy (Stamford Conn) v 4 n 4 Fall 1979 p 29-30

SOURCE: Energy (Stamford Conn) v 4 n 4 Fall 1979 p 29-30

CODEN: ENGYD4 ISSN: 0149-9386

PUBLICATION YEAR: 1979

LANGUAGE: English

AN 1980(12):1132 COMPENDEX DN 801290999

AB The production of hydrogen requires more effort than the other areas of hydrogen technology at present, for two reasons. First, **storage**, transport, and conversion technologies will not be used if economic processes for hydrogen production are not developed. Second, some of the most difficult technological problems are associated with hydrogen production. Energy sources and energy carriers available for hydrogen production include coal, electricity, nuclear process heat, and solar energy. **Storage** options include hydrides, liquid hydrogen, gaseous hydrogen in pressurized

tanks, and **storage** in underground caverns. Hydrogen may be converted to electricity in **fuel cells** and turbines, or used directly as a chemical feedstock and multipurpose fuel. Use of existing **gas pipelines** will be important for hydrogen use and a strong program is developing to establish **pipeline** compatibility with hydrogen. Another key technological advance is the development of lightweight, low-cost hydrogen **storage** for vehicles, important if hydrogen is to have widespread use as a non-polluting vehicle fuel.

AN 1980(12):1132 COMPENDEX DN 801290999
 CC 804 Chemical Products; 802 Chemical Apparatus & Plants; 521 Combustion & Fuels
 CT *HYDROGEN:Manufacture; HYDROGEN FUELS:Research
 ET S

L96 ANSWER 48 OF 66 JAPIO (C) 2007 JPO on STN
 ACCESSION NUMBER: 1996-273689 JAPIO
 TITLE: **FUEL CELL SYSTEM**
 INVENTOR: TOOHATA YOSHIKAZU; TAKUMI KOUJI
 PATENT ASSIGNEE(S): TOYOTA MOTOR CORP
 AISIN SEIKI CO LTD

PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 08273689	A	19961018	Heisei	H01M008-04

APPLICATION INFORMATION

STN FORMAT: JP 1995-100311 19950331
 ORIGINAL: JP07100311 Heisei
 PRIORITY APPLN. INFO.: JP 1995-100311 19950331
 SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1996

AN 1996-273689 JAPIO

AB PURPOSE: To enhance startability of a **fuel cell** system having a **fuel cell**.
 CONSTITUTION: A **fuel cell** system 10 is provided with an exhaust **gas** introducing passage 70 composed of a generating water circulating **pipe** line 50 being a **pipe** line when generating water of a generating water **storage tank** 62 is reused, an exhaust **gas** introducing passage part 72 to surround a branch **pipe** line 52 and an exhaust **gas** introducing **storage** chamber part 74 formed as an area containing a generating water discharge **pipe** line 60 to discharge the generating water outside from a **fuel cell** 40. A heat exchanger 78 is provided over these exhaust **gas** introducing **storage** chamber part 74 and generating water **storage tank** 62. When the generating water is frozen or there is the possibility of freezing in a water system of the generating water in an operation stopping period at the beginning of operation of the system, exhaust **gas** generated by combustion of methanol in a heater 24 of a reformer 20 is introduced to the exhaust **gas** introducing passage 70. Therefore, heat energy of the exhaust **gas** is given to the frozen generating water in the generating water circulating **pipe** line 50 or the like.

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IC ICM H01M008-04
 ICS H01M008-06

L96 ANSWER 49 OF 66 JAPIO (C) 2007 JPO on STN
ACCESSION NUMBER: 1994-203865 JAPIO
TITLE: **FUEL CELL SYSTEM**
INVENTOR: TAJIMA OSAMU; NAKATO KUNIHIRO; HAMADA AKIRA;
TATEYAMA EIJI
PATENT ASSIGNEE(S): SANYO ELECTRIC CO LTD
PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 06203865	A	19940722	Heisei	H01M008-04

APPLICATION INFORMATION

STN FORMAT: JP 1993-841 19930106
ORIGINAL: JP05000841 Heisei
PRIORITY APPLN. INFO.: JP 1993-841 19930106
SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined
Applications, Vol. 1994

AN 1994-203865 JAPIO

AB PURPOSE: To eliminate the need for operations such as replacing a
cylinder and to purge combustible **gas** without
depending on manual work by providing an exhaust **gas** burner
for subjecting fuel exhaust **gas** to combustion process and an
oxygen **gas** removing device or the like for separating inert
gas.

CONSTITUTION: Fuel exhaust **gas** exhausted from a **fuel**
cell main body 2 is subjected to combustion process by an
exhaust **gas** burner 12. Oxygen **gas** is separated
from generated burner exhaust **gas** by an oxygen **gas**
removing device 8 so that the exhaust **gas** is separated into
inert **gas**. Since the inert **gas** is always
stored in a **tank** 6 as purging **gas** for
combustible **gas** retained in a **fuel cell**
system, the inert **gas** in the **tank** 6 does not
become insufficient. Therefore, the need for conventional troublesome
operations such as replacing the **tank** 6 is eliminated, so
the combustible **gas** can be purged very easily. Furthermore,
a valve 7 is provided which is opened when operation of the main body
2 is stopped and which is also opened when purging of the combustible
gas is terminated, thereby enabling purging without depending
on manual work.

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IC ICM H01M008-04

ICS H01M008-06

L96 ANSWER 50 OF 66 JAPIO (C) 2007 JPO on STN
ACCESSION NUMBER: 1994-068892 JAPIO
TITLE: **FUEL CELL SYSTEM**
INVENTOR: TANIGUCHI SHUNSUKE; KANEKO MINORU; MURAKAMI SHUZO;
SAITO TOSHIHIKO
PATENT ASSIGNEE(S): SANYO ELECTRIC CO LTD
PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 06068892	A	19940311	Heisei	H01M008-04

APPLICATION INFORMATION

STN FORMAT: JP 1992-221648 19920820
ORIGINAL: JP04221648 Heisei

PRIORITY APPLN. INFO.: JP 1992-221648 19920820
 SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined
 Applications, Vol. 1994

AN 1994-068892 JAPIO

AB PURPOSE: To provide a **fuel cell** system for promptly responding to abrupt change in the load without forcing expansion of the system, and for improving the generation efficiency. CONSTITUTION: A **fuel cell** 1 having a fuel electrode, an oxidant electrode and a polymeric film interposed between the respective electrodes, is provided, and a fuel **gas** feeding **channel** 3 and an oxidant **gas** feeding **channel** 13 for feeding oxidant **gas**, are connected to both of the electrodes. In a **fuel cell** system of this structure, a fuel **gas** bifurcation **channel** for which the **channels** 3 and 13 are connected together in series, and an oxidant **gas** bifurcation **channel** 15 are connected to the fuel **gas** feeding **channel** 3 and the oxidant **gas** feeding **channel** 13. Compressors 6, 16 for compressing excess fuel **gas** as well as oxidant **gas**, and **storage tanks** 7, 17 for **storing** the compressed **gas**, are provided on the **channels** 5 and 15, respectively.

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IC ICM H01M008-04

ICS H01M008-06; H01M008-10

L96 ANSWER 51 OF 66 JAPIO (C) 2007 JPO on STN

ACCESSION NUMBER: 1990-132772 JAPIO

TITLE: **FUEL CELL** POWER GENERATING
 DEVICE

INVENTOR: ONISHI KOICHI

PATENT ASSIGNEE(S): ISHIKAWAJIMA HARIMA HEAVY IND CO LTD

PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 02132772	A	19900522	Heisei	H01M008-06

APPLICATION INFORMATION

STN FORMAT: JP 1988-285750 19881114

ORIGINAL: JP63285750 Showa

PRIORITY APPLN. INFO.: JP 1988-285750 19881114

SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined
 Applications, Vol. 1990

AN 1990-132772 JAPIO

AB PURPOSE: To enhance the load-follow-up performance of the device when loads are varied or when the device is re-started, and shorten the time needed to start the device, by providing a fuel **gas** supply equipment across a fuel **gas** **pipng** which connects together a reformer for reforming fuel into fuel **gas**, and the anode of a **fuel cell**. CONSTITUTION: A fuel **gas** supply equipment 25 which comprises a **conduit pipe** 26 for taking out one part of fuel **gas**, a compressor 27 for compressing the fuel **gas** which is taken out by the **conduit pipe** 26, a **tank** 28 for **storing** the **gas** compressed, a **conduit pipe** 29 for returning the fuel **gas** **stored** in the **tank** to the fuel **gas** **pipng**, and an adjusting valve 30 provided at the returning **conduit pipe** 29, is provided across a fuel

gas piping 19 which connects together a reformer 8 for reforming fuel into the fuel gas, and the anode 3 of a fuel cell 1. One part of fuel gas is taken out from the fuel gas piping 19 and then compressed and stored in the tank 28 so that a necessary amount of fuel gas can be additionally supplied to the fuel cell when needed. The load-follow-up performance of the device can thus be enhanced when loads are varied or when the device is re-started, and the time needed to start the device can be shortened.

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IC ICM H01M008-06
ICS H01M008-04

L96 ANSWER 52 OF 66 JAPIO (C) 2007 JPO on STN

ACCESSION NUMBER: 2006-294466 JAPIO

TITLE: FUEL CELL POWER GENERATION
SYSTEM

INVENTOR: NAKADA MITSUAKI; MAEDA HIDEO; KOSEKI HIDEKI

PATENT ASSIGNEE(S): MITSUBISHI ELECTRIC CORP

PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 2006294466	A	20061026	Heisei	

APPLICATION INFORMATION

STN FORMAT: JP 2005-114758 20050412

ORIGINAL: JP2005114758 Heisei

PRIORITY APPLN. INFO.: JP 2005-114758 20050412

SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 2006

AN 2006-294466 JAPIO

AB PROBLEM TO BE SOLVED: To solve a problem that, in a conventional fuel cell power generation system having a function for producing nitrogen gas, a deoxidation material having a deoxidation reaction speed sufficient for a flow rate of an oxygen-containing gas flowing through an oxygen remover must be used.

SOLUTION: This fuel cell power generation system is provided with: a fuel reformer 2 for producing hydrogen by reforming a fuel; a fuel cell 1 for generating power by using hydrogen produced by the fuel reformer 2; a tank 8 including the deoxidation material 15 for removing oxygen in a gas while storing the gas; a pressurization means 13 for pressurizing the oxygen-containing gas to supply it to the tank 8; an inactive gas pipe 16 for connecting the fuel reformer 2 or the fuel cell 1 to the tank 8; and a cutoff valve 17 installed in an intermediate part of the inactive gas pipe 16.

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IPCI H01M0008-04 [I,A]; H01M0008-06 [I,A];
H01M0008-10 [N,A];
H01M0008-04 [I,C*]; H01M0008-06 [I,C*];
H01M0008-10 [N,C*]

L96 ANSWER 53 OF 66 JAPIO (C) 2007 JPO on STN

ACCESSION NUMBER: 2006-147246 JAPIO

TITLE: FUEL CELL SYSTEM

INVENTOR: AOKI ATSUSHI
 PATENT ASSIGNEE(S): NISSAN MOTOR CO LTD
 PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 2006147246	A	20060608	Heisei	

APPLICATION INFORMATION

STN FORMAT: JP 2004-333379 20041117
 ORIGINAL: JP2004333379 Heisei
 PRIORITY APPLN. INFO.: JP 2004-333379 20041117
 SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 2006

AN 2006-147246 JAPIO

AB PROBLEM TO BE SOLVED: To improve the efficiency of a **fuel cell** by the use of the energy of high-pressure **fuel gas stored** in a **fuel tank**.

SOLUTION: A turbine 5 is driven to rotate by the expansion energy of high-pressure **hydrogen gas stored** in a **hydrogen tank** 2. The turbine 5 drives a compressor 7 through a coupling shaft 6 and supplies air compressed by the compressor 7 to a cathode of a **fuel cell** stack 11 through an air supply tube 9.

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IPCI H01M0008-06 [I,A]; H01M0008-00 [I,A];
 H01M0008-04 [I,A]; H01M0008-10 [N,A];
 H01M0008-06 [I,C*]; H01M0008-00 [I,C*];
 H01M0008-04 [I,C*]; H01M0008-10 [N,C*]

L96 ANSWER 54 OF 66 JAPIO (C) 2007 JPO on STN

ACCESSION NUMBER: 2006-139957 JAPIO

TITLE: **GAS-LIQUID SEPARATOR AND FUEL CELL SYSTEM**

INVENTOR: MATSUI AKIHIRO; KOTANI YASUNORI; NAKAJIMA NOBUTAKA

PATENT ASSIGNEE(S): HONDA MOTOR CO LTD

PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 2006139957	A	20060601	Heisei	

APPLICATION INFORMATION

STN FORMAT: JP 2004-326827 20041110
 ORIGINAL: JP2004326827 Heisei
 PRIORITY APPLN. INFO.: JP 2004-326827 20041110
 SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 2006

AN 2006-139957 JAPIO

AB PROBLEM TO BE SOLVED: To provide a **gas-liquid separator** capable of detecting that a **gas** is mixed, when draining by accurately grasping a water level in a **tank** that is installed within a **gas** passage system.

SOLUTION: This **gas-liquid separator** 1A installed in the **gas** passage is equipped with the **tank** 10 to **store** liquid separated from the **gas** in the **gas** passage, a drain pipe 11 to discharge the liquid **stored** in the **tank** 10 to the outside, a drain valve 12 for opening and closing the drain pipe 11, and a differential pressure detecting means for detecting differential

pressure ΔP , between a pressure (gas pressure $P_{<SB>1</SB>}$) in a region in the tank 10, where the gas exists, and a pressure (a water pressure $P_{<SB>H</SB>}$) at the bottom part side.

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IPCI H01M0008-04 [I,A]; H01M0008-10 [I,A];
H01M0008-04 [I,C*]; H01M0008-10 [I,C*]

L96 ANSWER 55 OF 66 JAPIO (C) 2007 JPO on STN
ACCESSION NUMBER: 2006-108024 JAPIO
TITLE: HIGH PRESSURE GAS FEEDER AND
FUEL CELL SYSTEM USING IT
INVENTOR: SAIKAI HIROAKI
PATENT ASSIGNEE(S): TOYOTA MOTOR CORP
PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 2006108024	A	20060420	Heisei	

APPLICATION INFORMATION

STN FORMAT: JP 2004-295961 20041008
ORIGINAL: JP2004295961 Heisei
PRIORITY APPLN. INFO.: JP 2004-295961 20041008
SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined
Applications, Vol. 2006

AN 2006-108024 JAPIO

AB PROBLEM TO BE SOLVED: To enable to detect occurrence of a failure of a pressure regulating valve and to carry out an appropriate processing.
SOLUTION: The fuel cell system has a plurality of high pressure tanks 10 which feed high pressure gas stored in a tank main body 11 by regulating pressure by a regulator 31 through a solenoid valve 33, connected in parallel to the fuel feeding passage 3. A pressure sensor 34 for detecting the inner pressure of a piping between the regulator 31 and the solenoid valve 33 is provided. When the detected value of the pressure sensor 34 is a prescribed value or more, it is judged that a fault has occurred in the regulator 31 and a processing such as giving a warning to the operator is carried out.

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IPCI H01M0008-04 [I,A]; H01M0008-10 [N,A];
H01M0008-04 [I,C*]; H01M0008-10 [N,C*]

L96 ANSWER 56 OF 66 JAPIO (C) 2007 JPO on STN
ACCESSION NUMBER: 2006-080093 JAPIO
TITLE: FUEL CELL SYSTEM
INVENTOR: TOOHATA YOSHIKAZU; TAKUMI KOJI
PATENT ASSIGNEE(S): TOYOTA MOTOR CORP
AISIN SEIKI CO LTD
PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 2006080093	A	20060323	Heisei	

APPLICATION INFORMATION

STN FORMAT: JP 2005-308742 20051024
ORIGINAL: JP2005308742 Heisei
PRIORITY APPLN. INFO.: JP 2005-308742 20051024
SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined

Applications, Vol. 2006

AN 2006-080093 JAPIO
 AB PROBLEM TO BE SOLVED: To enhance starting property of a **fuel cell** system having a **fuel cell**.
 SOLUTION: A **fuel cell** system 10 is provided with an exhaust **gas** introducing passage 70 composed of a **gas** introduction passage part 72 surrounding a generating water circulating **pipe** line 50 being a **pipe** line when generating water in a generating water **storage tank** 62, and a branch **pipe** line 52; and an exhaust **gas** introducing **storage** chamber part 74 formed as an area containing a generating water discharge **pipe** line 60 to discharge the generating water outside from a **fuel cell** 40. A heat exchanger 78 is provided over these exhaust **gas** introducing **storage** chamber part 74 and the generated water **storage tank** 62. When the generating water is frozen or there is the possibility of freezing in a water system of the generating water during an operation stopping period at the beginning of an operation of the system 10, exhaust **gas** generated by combustion of methanol in a heater 24 of a reformer 20 is introduced to the exhaust **gas** introducing passage 70. Thereby, heat energy of the exhaust **gas** is given to the frozen generating water in the generating water circulating **pipe** line 50 or the like.

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IPCI H01M0008-04 [I,A]; H01M0008-06 [I,A];
 H01M0008-04 [I,C*]; H01M0008-06 [I,C*]

L96 ANSWER 57 OF 66 JAPIO (C) 2007 JPO on STN
 ACCESSION NUMBER: 2005-156001 JAPIO
 TITLE: HOLLOW YARN MEMBRANE HUMIDIFIER
 INVENTOR: TANAKA SHIRO
 PATENT ASSIGNEE(S): NISSAN MOTOR CO LTD
 PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 2005156001	A	20050616	Heisei	F24F006-08

APPLICATION INFORMATION

STN FORMAT: JP 2003-394139 20031125
 ORIGINAL: JP2003394139 Heisei
 PRIORITY APPLN. INFO.: JP 2003-394139 20031125
 SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 2005

AN 2005-156001 JAPIO
 AB PROBLEM TO BE SOLVED: To provide a hollow yarn membrane humidifier which prevents the interfusion of condensed water, uniformly supplies **fuel gas** to a **fuel cell** and increase the power generation efficiency of the **fuel cell**.
 SOLUTION: The hollow yarn membrane humidifier is characterized by comprising a hollow yarn membrane module which allow for **storage** of a hollow yarn membrane in a **cylindrical housing** and moves water between the inside and outside of the hollow yarn membrane to humidify dry **gas**, a **storage** container 20 which **stores** therein the hollow yarn membrane module and a humidified **gas** exhaust **pipe** 9 which is connected to the **storage** container 20 so as to face a side opposite to the horizontal face on which the **storage** container 20 is disposed.

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IC ICM F24F006-08
ICS B01D063-02; F24F006-00
ICA H01M008-04; H01M008-10

L96 ANSWER 58 OF 66 JAPIO (C) 2007 JPO on STN

ACCESSION NUMBER: 2005-123093 JAPIO
TITLE: SWITCHING STATE DETERMINING SYSTEM OF CUTOFF VALVE
AND SWITCHING STATE DETERMINATION METHOD OF CUTOFF
VALVE

INVENTOR: TAKAKU KOICHI; TOGASAWA SHUICHI
PATENT ASSIGNEE(S): HONDA MOTOR CO LTD
PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 2005123093	A	20050512	Heisei	H01M008-04

APPLICATION INFORMATION

STN FORMAT: JP 2003-358367 20031017
ORIGINAL: JP2003358367 Heisei
PRIORITY APPLN. INFO.: JP 2003-358367 20031017
SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined
Applications, Vol. 2005

AN 2005-123093 JAPIO

AB PROBLEM TO BE SOLVED: To provide a switching state determination system of a cutoff valve and a switching state determination method of the cutoff valve, capable of surely and easily determining the switching state of the cutoff valve.
SOLUTION: This switching state determination system S1 is provided with a fuel gas supply piping 10 for making a hydrogen tank 5 and a fuel cell 6 communicate with each other; the cutoff valve 21 and a decompression valve 22 installed sequentially on the supply piping 10 from the hydrogen tank 5 toward the fuel cell 6; pressure sensors 41 and 42 for detecting pressure of the hydrogen gas of fuel gas supply parts 31 and 32 divided by the decompression valve 22 between the cutoff valve 21 and the fuel cell 6; an ammeter 53 and a voltmeter 54 for detecting the amount of power generated by the fuel cell 6; and a cutoff valve switching state determination means 70 for determining the switching state of the cutoff valve 21, based on the pressure of the hydrogen gas and the power generation amount; and is characterized by that the determination means 70 is equipped with a hydrogen gas consumption calculation part 72, a volume data storage part 73, a hydrogen gas supply volume calculating part 74, and a cutoff valve switching state determining part 75.

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IC ICM H01M008-04
ICS F17C013-04

L96 ANSWER 59 OF 66 JAPIO (C) 2007 JPO on STN

ACCESSION NUMBER: 2004-327170 JAPIO
TITLE: DRAINAGE DEVICE AND FUEL CELL
SYSTEM

INVENTOR: YOKOI TARO
PATENT ASSIGNEE(S): NISSAN MOTOR CO LTD
PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 2004327170	A	20041118	Heisei	H01M008-04

APPLICATION INFORMATION

STN FORMAT: JP 2003-118564 20030423
 ORIGINAL: JP2003118564 Heisei
 PRIORITY APPLN. INFO.: JP 2003-118564 20030423
 SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 2004

AN 2004-327170 JAPIO

AB PROBLEM TO BE SOLVED: To prevent the impossibility of draining even in a freezing environment.

SOLUTION: The drainage level of a water **storage tank** 5 for **collecting** and **storing** water in a **gas piping** is made variable, and water in the **storage tank** 5 is allowed to be drained from a drain outlet at a different drainage level according to a condition. For instance, a drain valve 6 installed in the **storage tank** 5 is used as a first drain means, and when drainage by the drain valve 6 is impossible, a relief valve 7 having a drainage level higher than that of the drain valve 6 is used as a second drain means to carry out drainage by the relief valve 7.

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IC ICM H01M008-04

ICA H01M008-10

L96 ANSWER 60 OF 66 JAPIO (C) 2007 JPO on STN

ACCESSION NUMBER: 2004-311180 JAPIO

TITLE: **FUEL CELL** POWER GENERATION SYSTEM, OPERATION METHOD OF THE SAME, PROGRAM, AND RECORDING MEDIUM

INVENTOR: YAMAMOTO MASAO; HARADA TERUMARU; UEDA TETSUYA

PATENT ASSIGNEE(S): MATSUSHITA ELECTRIC IND CO LTD

PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 2004311180	A	20041104	Heisei	H01M008-04

APPLICATION INFORMATION

STN FORMAT: JP 2003-102115 20030404
 ORIGINAL: JP2003102115 Heisei
 PRIORITY APPLN. INFO.: JP 2003-102115 20030404
 SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 2004

AN 2004-311180 JAPIO

AB PROBLEM TO BE SOLVED: To provide a fuel power generation system **collecting** recycled water from a waste fuel **gas** in a state of free from nutrition source for bacteria, efficiently trapping organic component dissolved from the members constituting the power generation system, capable of capturing fungus in order to prevent the fungus in a tap water from intrusion.

SOLUTION: The **fuel cell** power generation system is composed of a fuel processing device 4 reforming a raw fuel **gas** and generating a fuel **gas** with high content of hydrogen, an air supplying device 5 supplying air, the **fuel cell** 1 generating power by using the fuel **gas** with high content of hydrogen, and an oxidizer **gas**, a **gas**

-liquid separator 2 separating the exhaust fuel gas exhausted from the fuel cell 1 into gas and liquid, a storage tank 3 storing circulation water for cooling the fuel cell 1, a circulation water collecting channel 8 collecting the separated liquid as a circulation water and supplying it to the storage tank, and a heating device 7 arranged on the circulation water collecting channel 8, heating the separated liquid.

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IC ICM H01M008-04

ICA H01M008-10

L96 ANSWER 61 OF 66 JAPIO (C) 2007 JPO on STN

ACCESSION NUMBER: 2004-273164 JAPIO

TITLE: FUEL CELL SYSTEM

INVENTOR: ITO HITOSHI; KAWAI MIKIO; KATAMURA JUNJI

PATENT ASSIGNEE(S): NISSAN MOTOR CO LTD

PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 2004273164	A	20040930	Heisei	H01M008-04

APPLICATION INFORMATION

STN FORMAT: JP 2003-59057 20030305

ORIGINAL: JP2003059057 Heisei

PRIORITY APPLN. INFO.: JP 2003-59057 20030305

SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 2004

AN 2004-273164 JAPIO

AB PROBLEM TO BE SOLVED: To stably supply a necessary flow of hydrogen to a fuel cell even at low temperatures or even with a sudden increase in load.

SOLUTION: A hydrogen storage tank 1 is filled with a hydrogen storage material 5 and a heat exchanger 4 is installed therein. A hydrogen buffer tank 2 and a hydrogen storage tank 1 for storing hydrogen in gas phase are connected in parallel by a three-way pipe 8a and supply hydrogen to the negative electrode 31 of a fuel-cell stack 3 from the three-way pipe 8a via a selector-valve-equipped regulator 10 and a flow controller 7. Fluid discharged from the positive electrode 32 of the fuel-cell stack 3 is fed by a pump 6 to the heat exchanger 4 via a three-way valve 9 to promote the release of hydrogen from the hydrogen storage material 5.

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IC ICM H01M008-04

ICS F17C011-00; H01M008-06

ICA C01B003-00

L96 ANSWER 62 OF 66 JAPIO (C) 2007 JPO on STN

ACCESSION NUMBER: 2004-273141 JAPIO

TITLE: FUEL CELL SYSTEM

INVENTOR: HIWATARI KENICHI; MATSUOKA SATOSHI

PATENT ASSIGNEE(S): TOTO LTD

PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
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JP 2004273141 A 20040930 Heisei H01M008-04

APPLICATION INFORMATION

STN FORMAT: JP 2003-58403 20030305
ORIGINAL: JP2003058403 Heisei
PRIORITY APPLN. INFO.: JP 2003-58403 20030305
SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined
Applications, Vol. 2004

AN 2004-273141 JAPIO

AB PROBLEM TO BE SOLVED: To provide a **fuel cell** system having an SOFC module which can use a liquid fuel having a high energy density, such as a methanol, etc. as a fuel.
SOLUTION: The **fuel cell** system includes a fuel reforming **tank** for supplying a fuel **gas** containing a hydrogen and a carbon monoxide to a **fuel cell** module to which a plurality of solid oxide type **fuel cell** elements are connected, an exhaust **gas channel** in which an exhaust **gas** containing a steam generated by an exothermic reaction of an oxidizing agent supplied from an air blower with the fuel **gas** supplied from the fuel reforming **tank**, carbon dioxide and a heat in the **fuel cell** module, a first fuel **tank** for storing a **gas** fuel, a second fuel **tank** for storing a liquid fuel liquid, a heating and humidifying **tank** for supplying the fuel stored in the first fuel **tank** by heating and humidifying into the fuel reforming **tank**, and a vaporizing **tank** for vaporizing the fuel liquid stored in the second fuel **tank** by the heat from the exhaust **gas channel** to supply the vaporized fuel to the fuel reforming **tank**.

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IC ICM H01M008-04

ICS H01M008-06; H01M008-12

L96 ANSWER 63 OF 66 JAPIO (C) 2007 JPO on STN

ACCESSION NUMBER: 2002-050372 JAPIO
TITLE: **FUEL CELL PURGE DEVICE**
INVENTOR: SHIMADA TAKEAKI; KURIIWA TAKAHIRO
PATENT ASSIGNEE(S): HONDA MOTOR CO LTD
PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 2002050372	A	20020215	Heisei	H01M008-04

APPLICATION INFORMATION

STN FORMAT: JP 2000-237569 20000804
ORIGINAL: JP2000237569 Heisei
PRIORITY APPLN. INFO.: JP 2000-237569 20000804
SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined
Applications, Vol. 2002

AN 2002-050372 JAPIO

AB PROBLEM TO BE SOLVED: To provide a **fuel cell** purge device that eliminates the need for a purge **gas storage tank** or a complicated device structure and enables being small sized.
SOLUTION: The **fuel cell** purge device comprises a **fuel cell** that takes out electricity by utilizing chemical reaction of hydrogen and oxygen, a hydrogen supply means for supplying hydrogen to the **fuel cell**, and an

oxidant supply means for supplying oxidant to the **fuel cell** and this is a device for purging the residual **gas** that remains inside the **fuel cell** and the **pip**ing after the **fuel cell** has stopped operation. The device comprises a hydrogen combustor for obtaining an inert **gas** by reacting hydrogen and the air, and supplies hydrogen and the air into the hydrogen combustor during stopping of the **fuel cell** and supplies the obtained inert **gas** into the **fuel cell**.

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IC ICM H01M008-04
ICS H01M008-10

L96 ANSWER 64 OF 66 JAPIO (C) 2007 JPO on STN

ACCESSION NUMBER: 2002-050371 JAPIO

TITLE: **FUEL CELL SYSTEM**

INVENTOR: IMADA NORIYUKI; KAKO HIROYUKI; KAMO YUICHI

PATENT ASSIGNEE(S): BABCOCK HITACHI KK

PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 2002050371	A	20020215	Heisei	H01M008-04

APPLICATION INFORMATION

STN FORMAT: JP 2000-237117 20000804

ORIGINAL: JP2000237117 Heisei

PRIORITY APPLN. INFO.: JP 2000-237117 20000804

SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 2002

AN 2002-050371 JAPIO

AB PROBLEM TO BE SOLVED: To obtain a **fuel cell** system which is effective by removing sufficient volume of CO and at the same time utilizing the removed CO as fuel and which enables a safe stopping operation without the catalyst deterioration.
SOLUTION: The **fuel cell** system comprises a CO absorber 15 which separates CO that is contained in the reformed **gas** generated by a reformer 2 by absorbing it in the CO absorbing solution, a heater 14 which heats the CO absorbing solution that has absorbed the CO, a CO discharging unit 16 which discharges the CO from the heated CO absorbing solution, a cooler 21 which cools the CO absorbing solution that has discharged CO, and a **pipe** line that connects these equipment, and heat energy is taken out by introducing the separated CO into a **gas** turbine system 50 or a combustion furnace 22. The exhaust **gas** from the **gas** turbine 9 or the combustion furnace 22 is **stored** in a purge **gas** tank 24 and the **stored** exhaust **gas** is utilized during stopping of the **fuel cell** system, and the inside of the reformer 2 and the reform **gas** piping are made to be purged.

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IC ICM H01M008-04
ICS H01M008-00; H01M008-06

L96 ANSWER 65 OF 66 JAPIO (C) 2007 JPO on STN

ACCESSION NUMBER: 2002-008707 JAPIO

TITLE: **FUEL CELL EQUIPMENT**

INVENTOR: ENDO HIROYUKI

PATENT ASSIGNEE(S): IDEMITSU KOSAN CO LTD

PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 2002008707	A	20020111	Heisei	H01M008-06

APPLICATION INFORMATION

STN FORMAT: JP 2000-192989 20000627
 ORIGINAL: JP2000192989 Heisei
 PRIORITY APPLN. INFO.: JP 2000-192989 20000627
 SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 2002

AN 2002-008707 JAPIO

AB PROBLEM TO BE SOLVED: To provide **fuel cell** equipment facilitated in supply of liquefied petroleum **gas**.
 SOLUTION: A bulk **tank** 20 for **storing** liquefied petroleum **gas** as the fuel of a **fuel cell** 12 is provided, and the liquefied petroleum **gas** is directly filled from a bulk lorry to this bulk **tank** 20. With this structure, a sufficient quantity of the liquefied petroleum **gas** for continuously operating the **fuel cell** 12 can be **stored**, and the number of supply times of the liquefied petroleum **gas** is restricted to the required minimum limit. Since the supply of the liquefied petroleum **gas** is performed by using the bulk lorry, the liquefied petroleum **gas** supply work is easier than in the case using a heavy **cylinder** container hard to carry. The liquefied petroleum **gas** supplying frequency is reduced, and the supply work is facilitated, and the liquefied petroleum **gas** is thereby easily supplied.

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IC ICM H01M008-06

ICS B67D005-04; H01M008-00; H01M008-04;
 H01M008-10

L96 ANSWER 66 OF 66 JAPIO (C) 2007 JPO on STN

ACCESSION NUMBER: 2000-012057 JAPIO

TITLE: **FUEL CELL SYSTEM**

INVENTOR: MARUYAMA TERUO

PATENT ASSIGNEE(S): AISIN SEIKI CO LTD

PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 2000012057	A	20000114	Heisei	H01M008-04

APPLICATION INFORMATION

STN FORMAT: JP 1998-180988 19980626
 ORIGINAL: JP10180988 Heisei
 PRIORITY APPLN. INFO.: JP 1998-180988 19980626
 SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 2000

AN 2000-012057 JAPIO

AB PROBLEM TO BE SOLVED: To stably supply reformed **gas** to a **fuel cell** stack without causing moisture to be condensed in the reformed **gas** in starting and during operation of a **fuel cell** system.
 SOLUTION: A reformed **gas pipe** line 16, through which reformed **gas** flows between a reformer 3 and a **fuel cell** stack 10 is heated and temperature-held directly or through a high temperature heating oil circulating

pipe line 11 with a reformed gas, capable of out utilizing in the fuel cell stack 10 because of high CO concentration coming out of the reformer 3 in starting or exhaust gas of a combustion burner 6 for burning unused hydrogen from the fuel cell stack 10. The reformed gas pipe line 16 is held at a temperature which does not condense steam to avoid the unstable state of moisture in the reformed gas or stoppage of power generation, in the worst case caused by condensation of steam. A drain tank 15 is installed to remove the condensed water from the reformed gas pipe line 16 and storage, in case of the steam being condensed in the reformed gas pipe line 16.

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IC ICM H01M008-04
ICS H01M008-06

=> d his nofile

(FILE 'HOME' ENTERED AT 07:58:28 ON 18 MAY 2007)

FILE 'HCAPLUS' ENTERED AT 07:58:37 ON 18 MAY 2007

L1 1 SEA ABB=ON PLU=ON US20040191588/PN
SEL RN

FILE 'REGISTRY' ENTERED AT 07:58:58 ON 18 MAY 2007

L2 9 SEA ABB=ON PLU=ON (1310-73-2/BI OR 1333-74-0/BI OR
16940-66-2/BI OR 24937-79-9/BI OR 24981-14-4/BI OR
27029-05-6/BI OR 7440-06-4/BI OR 7440-18-8/BI OR 9002-86-2/
BI)

FILE 'WPIX' ENTERED AT 07:59:06 ON 18 MAY 2007

L3 1 SEA ABB=ON PLU=ON US20040191588/PN

FILE 'HCAPLUS' ENTERED AT 08:40:35 ON 18 MAY 2007

E DISPENSING APPARATUS/CT

L4 3300 SEA ABB=ON PLU=ON "DISPENSING APPARATUS"+PFT,NT/CT

L5 4343 SEA ABB=ON PLU=ON DISPENS?(2A) (DEVIC? OR APPARATUS?)
E STORAGE/CT

L6 12771 SEA ABB=ON PLU=ON STORAGE+PFT,NT/CT

L7 1454326 SEA ABB=ON PLU=ON STORAGE? OR STORE# OR STORING? OR
COLLECT? OR ACCUMULAT?

L8 QUE ABB=ON PLU=ON TANK? OR HOUSING? OR CASING? OR
SHROUD? OR JACKET? OR WRAP? OR GUARD? OR SHIELD? OR
SCREEN?

L9 QUE ABB=ON PLU=ON MULTITUBULAR? OR MICROTUBULAR? OR
TUBULAR? OR TUBE# OR TUBING# OR TUBUL? OR TUBAT? OR
TUBIFORM? OR TUBELIKE? OR PIPE# OR PIPING# OR PIPELI? OR
PIPETTE? OR HOSE? OR DUCT? OR CONDUIT? OR CANNULA? OR
CHANNEL? OR CYLIND? OR ADJUTAG?

L10 40094 SEA ABB=ON PLU=ON FLUID(3A) (COMMUNCAT? OR LINK? OR
FLOW?)

L11 684 SEA ABB=ON PLU=ON (L4 OR L5) AND (L6 OR L7)

L12 14 SEA ABB=ON PLU=ON L10 AND L11

E TARGET GAS/CT

E GAS STOREG/CT

L13 130205 SEA ABB=ON PLU=ON (GAS OR HYDROGEN) (L) (L6 OR L7)

L14 175 SEA ABB=ON PLU=ON L13 AND L11

L15 51 SEA ABB=ON PLU=ON L14 AND L8

L16 24 SEA ABB=ON PLU=ON L15 AND L9

L17 5 SEA ABB=ON PLU=ON L12 AND L7 AND L8 AND L9

L18 0 SEA ABB=ON PLU=ON L17 AND (GAS? OR HYDROGEN?)

FILE 'REGISTRY' ENTERED AT 08:59:51 ON 18 MAY 2007

E HYDROGEN/CN

L19 1 SEA ABB=ON PLU=ON HYDROGEN/CN

FILE 'HCAPLUS' ENTERED AT 09:00:06 ON 18 MAY 2007

L20 1111335 SEA ABB=ON PLU=ON L19 OR HYDROGEN# OR H2

E HYDROGEN/CT

L21 326399 SEA ABB=ON PLU=ON HYDROGEN+PFT,NT/CT

L22 129 SEA ABB=ON PLU=ON (L20 OR L21) AND (L4 OR L5)

L23 36 SEA ABB=ON PLU=ON L22 AND (L6 OR L7)

L24 3 SEA ABB=ON PLU=ON L23 AND L8 AND L9

L25 58166 SEA ABB=ON PLU=ON (L20 OR L21) AND (L6 OR L7)

L26 3158 SEA ABB=ON PLU=ON L25 AND FUEL(A) CELL?

L27 673 SEA ABB=ON PLU=ON L26 AND L8
 L28 150 SEA ABB=ON PLU=ON L27 AND L9
 L29 64 SEA ABB=ON PLU=ON L28 AND PROC/RL
 L30 2 SEA ABB=ON PLU=ON L29 AND (L4 OR L5)
 L31 56 SEA ABB=ON PLU=ON L15 OR L16 OR L17 OR L18
 L32 6 SEA ABB=ON PLU=ON L31 AND FUEL(A)CELL?
 L33 68 SEA ABB=ON PLU=ON L29 OR L30 OR L32
 L34 3150 SEA ABB=ON PLU=ON (BORE? OR SHELL) (2A) (SIDE? OR WALL?)
 L35 0 SEA ABB=ON PLU=ON L33 AND L34
 L36 7 SEA ABB=ON PLU=ON L33 AND (SIDE? OR WALL?)
 L37 0 SEA ABB=ON PLU=ON L33 AND MICROTUB?
 L38 10 SEA ABB=ON PLU=ON L33 AND HYDROGEN GAS
 L39 8989 SEA ABB=ON PLU=ON CARRIER (3A) MATERIAL?
 L40 0 SEA ABB=ON PLU=ON L33 AND L39
 L41 1 SEA ABB=ON PLU=ON L33 AND (BORE? OR SHELL?)
 L42 68 SEA ABB=ON PLU=ON L33 OR L35 OR L36 OR L37 OR L38 OR L40
 OR L41
 L43 228834 SEA ABB=ON PLU=ON SEAL? OR SEALING?
 L44 3 SEA ABB=ON PLU=ON L42 AND L43
 L45 68 SEA ABB=ON PLU=ON L42 OR L44
 L46 9 SEA ABB=ON PLU=ON L45 AND (STORAGE? OR DISPENS?) (2A) SYSTE
 M?
 L47 49 SEA ABB=ON PLU=ON L45 AND GAS?
 L48 52 SEA ABB=ON PLU=ON L46 OR L47
 L49 0 SEA ABB=ON PLU=ON L48 AND L1
 E FUEL CELLS/CT
 L50 86608 SEA ABB=ON PLU=ON "FUEL CELLS"+PFT,NT/CT
 L51 16 SEA ABB=ON PLU=ON L11 AND L50
 L52 13 SEA ABB=ON PLU=ON L51 AND (L20 OR L21)
 L53 2 SEA ABB=ON PLU=ON L52 AND DEV/RL
 L54 12 SEA ABB=ON PLU=ON L48 AND DEV/RL
 L55 25 SEA ABB=ON PLU=ON (L52 OR L53 OR L54)

FILE 'WPIX' ENTERED AT 09:45:54 ON 18 MAY 2007

L56 1950678 SEA ABB=ON PLU=ON STORAGE?/BIX,BIEX,TT,ABEX OR STORE#/BIX
 ,BIEX,TT,ABEX OR STORING?/BIX,BIEX,TT,ABEX OR COLLECT?/BIX,
 BIEX,TT,ABEX OR ACCUMULAT?/BIX,BIEX,TT,ABEX
 L57 1748662 SEA ABB=ON PLU=ON TANK?/BIX,BIEX,TT,ABEX OR HOUSING?/BIX
 ,BIEX,TT,ABEX OR CASING?/BIX,BIEX,TT,ABEX OR SHROUD?/BIX,BI
 EX,TT,ABEX OR JACKET?/BIX,BIEX,TT,ABEX OR WRAP?/BIX,BIEX,TT
 ,ABEX OR GUARD?/BIX,BIEX,TT,ABEX OR SHIELD?/BIX,BIEX,TT,ABE
 X OR SCREEN?/BIX,BIEX,TT,ABEX
 L58 2761405 SEA ABB=ON PLU=ON MULTITUBULAR?/BIX,BIEX,TT,ABEX OR
 MICROTUBULAR?/BIX,BIEX,TT,ABEX OR TUBULAR?/BIX,BIEX,TT,ABEX
 OR TUBE#/BIX,BIEX,TT,ABEX OR TUBING#/BIX,BIEX,TT,ABEX OR
 TUBUL?/BIX,BIEX,TT,ABEX OR TUBAT?/BIX,BIEX,TT,ABEX OR
 TUBIFORM?/BIX,BIEX,TT,ABEX OR TUBELIKE?/BIX,BIEX,TT,ABEX
 OR PIPE#/BIX,BIEX,TT,ABEX OR PIPING#/BIX,BIEX,TT,ABEX OR
 PIPELI?/BIX,BIEX,TT,ABEX OR PIPETTE?/BIX,BIEX,TT,ABEX OR
 HOSE?/BIX,BIEX,TT,ABEX OR DUCT?/BIX,BIEX,TT,ABEX OR
 CONDUIT?/BIX,BIEX,TT,ABEX OR CANNULA?/BIX,BIEX,TT,ABEX OR
 CHANNEL?/BIX,BIEX,TT,ABEX OR CYLIND?/BIX,BIEX,TT,ABEX OR
 ADJUTAG?/BIX,BIEX,TT,ABEX
 L59 100177 SEA ABB=ON PLU=ON L56 AND L57 AND L58
 L60 792 SEA ABB=ON PLU=ON L59 AND FUEL CELL#/BIX,BIEX,TT,ABEX
 L61 494 SEA ABB=ON PLU=ON L60 AND (GAS#/BIX,BIEX,TT,ABEX OR
 HYDROGEN GAS#/BIX,BIEX,TT,ABEX)
 L62 340 SEA ABB=ON PLU=ON L61 AND H01M0008?/IPC
 L63 16 SEA ABB=ON PLU=ON L61 AND H01M0008-18/IPC
 L64 7 SEA ABB=ON PLU=ON L63 AND H01M0002?/IPC

L65 1 SEA ABB=ON PLU=ON L64 AND L3
 L66 12 SEA ABB=ON PLU=ON L61 AND DISPENS?/BIX,BIEX,TT,ABEX
 L67 6 SEA ABB=ON PLU=ON L61 AND DISPENS?/BIX,BIEX,TT,ABEX (4A) GAS?
 S?/BIX,BIEX,TT,ABEX
 L68 12 SEA ABB=ON PLU=ON L64 OR L67

FILE 'COMPENDEX' ENTERED AT 09:51:45 ON 18 MAY 2007

L69 0 SEA ABB=ON PLU=ON L56 AND L57 AND L58
 L70 3802 SEA ABB=ON PLU=ON L7 AND L8 AND L9
 L71 27 SEA ABB=ON PLU=ON L70 AND FUEL CELL?
 L72 0 SEA ABB=ON PLU=ON L71 AND DISPENS? (4A) GAS?
 L73 4 SEA ABB=ON PLU=ON L71 AND (DISPENS? OR STOR?) (4A) GAS?
 L74 12 SEA ABB=ON PLU=ON L71 AND (GAS# OR HYDROGEN GAS#)
 L75 12 SEA ABB=ON PLU=ON (L72 OR L73 OR L74)

FILE 'JAPIO' ENTERED AT 09:55:18 ON 18 MAY 2007

L76 39022 SEA ABB=ON PLU=ON L7 AND L8 AND L9
 L77 7075 SEA ABB=ON PLU=ON L76 AND (GAS# OR HYDROGEN GAS#)
 L78 174 SEA ABB=ON PLU=ON L77 AND FUEL CELL?
 L79 42 SEA ABB=ON PLU=ON L78 AND (DISPENS? OR STOR?) (4A) GAS?
 L80 0 SEA ABB=ON PLU=ON L79 AND H01M0008-18/IPC
 L81 40 SEA ABB=ON PLU=ON L79 AND H01M0008?/IPC
 L82 1 SEA ABB=ON PLU=ON L81 AND L10
 L83 0 SEA ABB=ON PLU=ON L81 AND L34
 L84 0 SEA ABB=ON PLU=ON L81 AND MICROTUB?
 L85 0 SEA ABB=ON PLU=ON L81 AND MICROFIB?
 L86 1 SEA ABB=ON PLU=ON L81 AND (SEPATAT? OR DIVID? OR
 COMPARTMENT?)
 L87 37 SEA ABB=ON PLU=ON L81 AND H01M0008-04/IPC
 L88 12 SEA ABB=ON PLU=ON L87 AND H01M0008-06/IPC
 L89 10 SEA ABB=ON PLU=ON L87 AND H01M0008-10/IPC
 L90 4 SEA ABB=ON PLU=ON L88 AND H01M0008-10/IPC
 L91 18 SEA ABB=ON PLU=ON (L88 OR L89 OR L90)
 L92 19 SEA ABB=ON PLU=ON L91 OR L86
 L93 0 SEA ABB=ON PLU=ON L92 AND (FIRST OR 1ST OR 1 ST OR 2ND
 OR 2 ND OR SECOND) (A) (END# OR SIDE#)
 L94 0 SEA ABB=ON PLU=ON L78 AND (FIRST OR 1ST OR 1 ST OR 2ND
 OR 2 ND OR SECOND) (A) (END# OR SIDE#)
 L95 19 SEA ABB=ON PLU=ON (L92 OR L93 OR L94)

FILE 'HCAPLUS, WPIX, COMPENDEX, JAPIO' ENTERED AT 10:20:04 ON 18 MAY 2007

L96 66 DUP REM L55 L68 L75 L92 (2 DUPLICATES REMOVED)
 ANSWERS '1-25' FROM FILE HCAPLUS
 ANSWERS '26-35' FROM FILE WPIX
 ANSWERS '36-47' FROM FILE COMPENDEX
 ANSWERS '48-66' FROM FILE JAPIO